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# GOVERNMENT ACTIVITIES IN THE NORTH

## 1969 REPORT AND 1970 PLANS

### ADVISORY COMMITTEE

### ON NORTHERN DEVELOPMENT

This report is also available in French  
Cette publication existe aussi en version française

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ON NORTHERN DEVELOPMENT  
ADVISORY COMMITTEE

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Information Canada  
Ottawa, 1970

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## MEMORANDUM FOR THE ADVISORY COMMITTEE ON NORTHERN DEVELOPMENT

Document ND 482

### Government Activities in the North—1969 and plans for 1970 and 1971

The Advisory Committee on Northern Development was instructed by the Cabinet on January 22, 1953, to report immediately and periodically thereafter on all phases of development in the Canadian Arctic. At the seventh meeting of the A.C.N.D., it was agreed that the report should be brought up to date on an annual basis.

The attached report covers the activities of all federal departments and agencies operating in the territories, and it documents substantially both the scientific and non-scientific aspects of northern activities.

In 1969, the Advisory Committee published its first edition in the French language, and although its appearance was later than we expected, it received considerable acclaim.

*Government Activities in the North* has come to be a much sought after reference book and its popularity is due solely to the cooperation of the many contributors.

This report is unclassified and additional copies are available by writing to the Information Service, Department of Indian Affairs and Northern Development.

L.A.C.O. Hunt  
Secretary

Advisory Committee on Northern Development  
Centennial Tower Building, 400 Laurier  
Avenue West, Ottawa 4, Ontario, Canada.

June, 1970



# **ADVISORY COMMITTEE ON NORTHERN DEVELOPMENT**

## ADVISORY COMMITTEE ON NORTHERN DEVELOPMENT

### Responsibilities

To advise the government on questions of policy relating to civilian and military undertakings in northern Canada and to provide for the effective coordination of all government in that area.

### Review of 1969 Operations

Eight reports were circulated during the year, with the most important of them entitled *A Strategy for Northern Development*.

Now that the Territories have firmly established administrations on the ground, the Department of Indian Affairs and Northern Development has turned its attention to northern development in terms of social and economic programs and how best to muster the financial requirements so that the people of the northern territories can experience a rising standard of living and quality of life comparable to that enjoyed by most Canadians in the Provinces.

The "Strategy for Northern Development" envisages interdepartmental cooperation and to this end the Advisory Committee on Northern Development has initiated discussions among those departments, whose contributions to northern development justify involvement in a broad range of programs and the effort needed to coordinate these programs in a northern strategy.

The Advisory Committee on Northern Development, furthermore decided it required a coordinating arm to review the many northern programs. Thus was established a Coordinating Committee with the following interim terms of reference:

- a) Propose specific programs for the development of the northern territories in order to coordinate these programs into a general plan;
- b) To consider and advise on all proposed programs and studies that may have a major bearing on the development of the northern territories;
- c) Where required to establish *ad hoc* working groups to consider particular aspects of northern development; and
- d) To circulate relevant information and to advise the senior officers of those departments and agencies with northern interests on aspects of northern development discussed in committee.

To accomplish these functions, the Secretariat of the Advisory Committee on Northern Development will be enlarged, not only to provide the services required to the new committees, but also to special sub-committees which, it is hoped, will be re-activated.

L.A.C.O. Hunt  
Secretary

# **CANADA DEPARTMENT OF LABOUR**

## CANADA DEPARTMENT OF LABOUR

### Responsibilities

Conciliation and other services for maintaining good industrial relations; administration of labour standards and employment safety legislation, fair wages policy, fair employment practices, and female employees equal pay legislation; sale and administration of government annuities; compensation to Public Service employees for occupational injury or illness; surveys of wage rates, hours of labour, and other working conditions.

### Long-Term Plans

Normal planning to meet responsibilities.

## Review of 1969 Operations

### Industrial Relations

Conciliation and Arbitration Proceedings. Four industrial disputes were mediated involving companies and trade unions in the Yukon Territory. One dispute was mediated in the Northwest Territories.

### Representation Proceedings

The Canada Labour Relations Board processed 23 applications from trade unions for certification as bargaining agents of units of employees of companies operating north of the sixtieth parallel. Twenty of the applications affected units of employees in the Yukon Territory, and three affected units of employees in the Northwest Territories.

In the two territorial areas the Board issued 16 certificates, rejected one application, permitted the withdrawal of two and adjourned one case *sine die*. There were three applications pending at the end of 1969.

### Accident Prevention and Compensation

In addition to its long standing activities in the Yukon Territory and Northwest Territories with respect to the administration of the Government Employees Compensation Act, the Accident Prevention and Compensation Branch of the Department has, in 1969, made considerable progress towards the implementation of a comprehensive employment safety program in premises of employers subject to the Canada Labour (Safety) Code as well as in Public Service premises under the authority of the Occupational Safety Policy for the Public Service of Canada.

Claims of Federal Government employees, usually employed in the Yukon Territory and Northwest Territories, for compensation for occupational accidents or diseases were received in the Branch and forwarded to the Workmen's Compensation Board of Alberta for adjudication and payment under a federal-provincial arrangement. A total of 549 claims was received and disbursements were \$118,411.

## **Annuities**

Approximately 250 Government Annuities are in force in the North. Servicing contracts and other business relating to Government Annuities were carried out by correspondence.

## **Federal Contracts**

### **a) Inspections on Government Contracts.**

During 1969 — 18 inspections were made by Branch Officers. Of these, 14 were made in the N.W.T. and 4 in the Y.T. — These inspections directly affected 11 main contractors and 27 sub-contractors. Wage adjustments were collected and (1) one main contractor was assessed \$73.05 and (1) one sub-contractor was assessed \$565.54 totalling \$638.59 and covering wage arrears due (11) eleven employees.

### **b) Wage Schedules Issued.**

	N.W.T.	Y.T.
Construction	79	25
Service	4	2

## **Standards Division**

There have been no activities respecting the enforcement of the Canada Labour (Standards) Code occurring directly in the North (Yukon, Northwest Territories). A number of complaints alleging violation of the Code have been investigated and inspections made respecting non-scheduled air carriers that operate into the North and thus affecting employees who work in the North at least part of their work time, but all dealings in respect to these matters have been carried out with or at their southern basis or offices.

A number of inquiries or complaints received from northern workers have concerned operations of local nature thus not being subject to the Canada Labour (Standards) Code and these matters have been referred to the territorial administrators of their labour standards regulations.

## **Economics and Research**

The Economics and Research Branch conducts two annual surveys of employers in Canada, one on wage rates, salaries, and standard hours of labour, the other on working conditions. The surveys included twenty-seven establishments in the Yukon Territory of which three are under federal jurisdiction and thirty-seven in the Northwest Territories of which three are under federal jurisdiction. These two regions were also included in a special study on the distribution of employees by wage and salary rates in industries under federal jurisdiction in connection with the Canada Labour (Standards) Code. The branch also maintains a file of collective agreements covering employees in these areas.

## **Plans for 1970**

Normal operations.



# **CANADIAN BROADCASTING CORPORATION**

## **CANADIAN BROADCASTING CORPORATION**

### **NORTHERN SERVICE**

#### **Responsibilities**

To provide a broadcasting service in the North and to inform the Canadian public about the North by means of radio and television programs.

#### **Long-Term Plans**

The launching of communication satellites in 1972 will provide live television network service to places in the North where ground receiving stations are installed. A list of these has not yet been announced. It will not be possible to pick up the satellite signal on home receivers.

Meanwhile, the CBC will continue to carry out its program of building a total of approximately 40 frontier coverage television stations to broadcast programs videotaped from its networks.

To improve and extend the shortwave service to the far North, the CBC plans to add three 250 kw transmitters at its shortwave plant at Sackville, N.B., and to construct an antenna system directed to the North. When these are complete, the present eight-and-one-half hours of daily shortwave broadcasts to the North in English, French and Eskimo will be doubled.

### **Review of 1969 Operations**

#### **Operations**

Frontier coverage package stations were established at Fort Nelson and Cassiar in northern British Columbia; Watson Lake, Dawson City, Elsa and Clinton Creek in the Yukon Territory; Pine Point, Fort Simpson and Inuvik in the Northwest Territories.

Three communities in the Northwest Territories were connected to the Mackenzie radio network of the Northwest Service: Fort Resolute, Wrigley and Fort Norman. The Mackenzie radio network, with its program centre at Yellowknife, now serves twelve communities in the Great Slave Lake/Mackenzie area.

The power of station CFFB Frobisher Bay was increased from 40 to 250 Watts.

Work was completed on the construction of new studio and office facilities for station CHAK Inuvik. Plans were made for the construction of new studio and office facilities for station CFFB Frobisher Bay.

#### **Programs**

The basic program service on the medium-wave stations in the North and on short-wave to the North continued as in previous years.

The radio stations at Whitehorse, Yellowknife, Inuvik, Fort Churchill, Frobisher Bay and Happy Valley broadcast about 130 hours weekly on 29 transmitters. The shortwave service broadcasts 58 hours weekly in English, French and Eskimo.

The Northern Service stations broadcast programs from the national network as well as locally produced programs, including many in local Indian and Eskimo languages.

Originated and formerly broadcast by the Northern Service since 1964, INDIAN MAGAZINE is now produced as a national program in Toronto, carried by the English radio network including Northern Service stations and shortwave. The program contains fifteen minutes weekly of news and information gathered across the country with Indian people as the principal participants.

News, public affairs, and entertainment programs were broadcast at CFFB Frobisher Bay in Eastern Eskimo; by CHFC Fort Churchill in Northern Cree, Chipewyan and Eastern Eskimo; by CFYK Yellowknife in Chipewyan, Cree, Slavey, Dogrib, Eastern and Coppermine Eskimo; and by CHAK Inuvik in Western Eskimo, Slavey and Loucheux. Eight and-a-half hours a week of similar programs were broadcast by shortwave in the Eastern, Central, and Coppermine dialects of Eskimo.

In April, an Eskimo group at Povungnituk produced their own drama series, ANGUTMARIOYOMAYOQ ("He Wants to Be a Man") and broadcast on the Northern Service shortwave, and at CFFB Frobisher Bay and CHFC Churchill. This series depicts the debilitating effects of relief on a man who wishes to work for his own support, while circumstances and lack of employment prevent him from doing so. Some weaknesses in the present welfare programs in the North are expressed while pointing out the difficulties in trying to overcome these weaknesses and offering remedies which would fit in with the Eskimo culture and environment.

Later in the year, some twenty Eskimo people from the Povungnituk community took part in a second forty-episode series of dramas SIVUMUT ("To Go Forward"). This series was produced by Peter Murdoch and broadcast on the Northern Service shortwave as well as locally at CFFB Frobisher Bay and CHFC Fort Churchill. Set in the imaginary community of Seeawatalik, the underlying theme is the need for unity amongst people who are under the influence of new modes of thought and technology, and who are striving to make a successful bridge between the past and the future.

A special half-hour drama, AKSANERK ("Northern Light") also produced by Peter Murdoch at Povungnituk, was broadcast by Northern Service shortwave on Christmas Eve.

The dramas are instant theatre: there is no script. Each actor portrays what he feels about the theme while following a basic story outline.

Some of the many radio documentary programs prepared by the Northern Service's Montreal Production Centre for broadcast in the North and on the national CBC English radio network were:

- Six 15-minute programs from Carleton University in Ottawa of excerpts from the series of talks "The Changing Northland".

- A 15-minute talk “Plight of the White”.
- A 30-minute special program prepared from material gathered at the conference on “Community Development in the Middle North” held at Dartmouth College, New Hampshire in February and March. The program was placed on disc, flpsided by songs about the North written and sung by Robert Ruzicka of Inuvik and Edmonton.
- Two 15-minute talks using material gathered from the conference on “Arctic Transportation”.
- A 30-minute talk “Myth of the Rich North”.
- Two special 50-minute features for broadcast on the English Network program BETWEEN OURSELVES — “The Kayak is Going, the Igloo is Gone” in May, and “The True North, Far and Flung” in November. The two programs were later recorded for inclusion in the 13-part CBC International transcription series “There’s a Land That’s Wild and Free”.
- Twelve programs in a series “Those Were the Days” about the men and women who opened up the frontier of the Canadian northlands: bush pilots, R.C.M.P., Hudson’s Bay men, prospectors, trappers and plainadventurers, telling the tales of those early attempts to civilize the hostile North. These programs were later re-titled “How the North was Won” and recorded in a CBC International Service transcription series.
- A 15-minute special in February, about the large sale of oil and gas leases in the North.
- A 15-minute tribute in August, to the late Judge Sissons called “The One Who Listens”.
- A 30-minute talk in August, from material gathered at the Mid-Canada Development Corridor Conference at Lakehead University.
- A 30-minute special in October, on the voyage of the S.S. *Manhattan* in October.
- A 30-minute special in October, from the conference on “Productivity and Conservation in Tundra Regions of Circumpolar Lands” held in Edmonton.

The program series ASSIGNMENT NORTH, begun in August 1968 on the Northern Service, was heard once a week on the national English radio network, starting in October. The ASSIGNMENT NORTH programs examine those subjects which have particular relevance to northern Canada. One day there may be the story of polar bears migrating to Churchill; a talk about who owns the Arctic ice; human interest stories such as a report on Eskimo men learning the oil drilling business in Edmonton; scientific stories about the development of northern transportation and profiles of people whose experiences in the North or contributions to northern life, mark them for special study.

Some 1,176 messages of greetings, family news, announcement of births, graduation from school and special announcements were broadcast in English and French on NORTHERN MESSENGER, the program that was first broadcast weekly in 1932 and is now a daily 15-minute feature on shortwave. With the addition to the Montreal staff in August of an Eskimo-language Broadcaster/Producer, NORTHERN MESSENGER also carries the news in Eskimo. A new program of information and

music, NALLACHINE (“Things To Listen To”) is broadcast daily in Eskimo, Monday through Friday from Montreal.

### **Shortwave Service – Indian and Eskimo Languages**

In addition to daily news in Eskimo directed to the Eastern Arctic in the transmission period 1700-1750 hrs. EST, programs totalling an hour and a half daily in Eskimo are scheduled in the transmission period 2000-0200 hrs. EST. These programs are produced in the northern service studios at Montreal, Frobisher Bay, Fort Churchill and Yellowknife.

NOTE: All Eskimo programs are in the Eastern dialect unless otherwise specified.

ESKIMO NEWS & NORTHERN MESSENGER. Mondays through Fridays, 1734-1749 hrs. (with repeat at 2015-2030 hrs.). Sundays, 1734-1749 hrs. (no repeat). Produced at Montreal.

UQAUSI (Churchill Calling). Mondays, 2030-2100 hrs. (repeats Wednesdays 0020-0050 hrs.) Eskimo. Feature Magazine program produced by radio station CHFC Churchill.

INNUKNUT TURRATUT (To the People). Tuesdays, 2030-2100 hrs. (repeats Thursdays 0020-0050 hrs.). An Eskimo program of messages, features and music produced at CHFC Churchill.

TETERKAT (Messages). Wednesdays, 2030-2100 hrs. (repeats Fridays 0020-0050 hrs.). Eskimo. Produced by radio station CFFB Frobisher Bay, featuring personal messages from Eskimo patients in southern hospitals and students attending “outside” schools.

IKALUIT OQAUSI (Frobisher Calling). Thursdays, 2030-2100 hrs. (repeats Mondays 0020-0050 hrs.). Eskimo. Feature magazine program produced by radio station CFFB Frobisher Bay.

INOONOOT OOKALEEMAGAT (Eskimo Magazine). Fridays, 2030-2100 hrs. (repeats Tuesdays 0020-0050 hrs.). Information program on Northern, National and International news events. Produced by radio station CFFB Frobisher Bay.

NALLACHINE (Things to listen to). Mondays through Fridays, 2300-2330 hrs. Program is in Eskimo, produced in Montreal. Contents both informational and musical.

NEEJAWATIT IKALUINEE (Eskimo Hit Parade). Saturdays, 1719-1749 hrs. Eskimo.

INNUIT NUNANITUNUT (Looking North). Saturdays, 2030-2100 hrs. Eastern and Copper Eskimo. Produced by radio station CFYK Yellowknife, featuring news of Mackenzie District, reports of Territorial affairs, interviews with Eskimo people living at or visiting Yellowknife, etc.

**Broadcasts in Eskimo: Radio Station CFFB Frobisher Bay.**

CFFB broadcasts in Eskimo, French and English. Two of the six announcer/operators are Eskimo. Out of a broadcast week of 132 hours, 18 hours are in Eskimo although much of the service in English is of direct interest to the Eskimo audience. In addition, CFFB provides special coverage of news events including territorial and federal elections.

EASTERN ARCTIC NEWS. Daily at 0735, 1835 and 2300 hrs. English and Eskimo. Local news is gathered from eastern Arctic settlements, from CBC's newsroom in Yellowknife and from news reporters in Ottawa.

ULLASIU (The Morning Show). Mondays through Fridays, 0900-1000 hrs. Music and spoken word notices of upcoming community events of special interest to women; talks and interviews on housekeeping and public hygiene.

IKALUIT OQAUSI (Frobisher Calling). Mondays, 1400-1430 hrs. (with repeat broadcast at 1930-2000 hrs.). Eskimo. Program serves traditional cultural interests, featuring stories, interviews, legends and folk music gathered in settlements throughout the eastern Arctic.

TETERKAT (Messages). Tuesdays, 1400-1430 hrs. (with repeat broadcast at 1930-2000 hrs.). Features messages from Eskimo patients and students "outside" to their kinfolk in the North, and messages between persons at isolated communities throughout the Arctic.

INOONOOT OOKALEEMAGAT (Eskimo Magazine). Wednesdays, 1400-1430 hrs. (with repeat broadcast at 1930-2000 hrs.). Eskimo. News-magazine program which provides in-depth summary of recent happenings. Program regularly includes Co-op news.

NEEJAWATIT IKALUINEE (Frobisher Hit Parade). Thursdays, 1400-1430 hrs. Eskimo. Light music of current interest.

ANNAIGHT (Ladies Talk). Fridays, 1400-1430 hrs. Eskimo. Open-line program dealing with public affairs of special interest to women.

NEEJAWATIT INOONOOT (Hard Rock Show). Mondays through Fridays, 1600-1655 hrs. Contemporary sounds in music.

INNUIT NUNANITUNUT (Looking North). Fridays, 1930-2000 hrs. Produced by radio station CFYK Yellowknife. Program features news of the Mackenzie District, reports on Territorial affairs and interviews with Eskimo people living at or visiting Yellowknife.

SATURDAY DATE. Saturdays, 1400-1700 hrs. Light music request show.

**Indian and Eskimo Broadcasts: Radio Station CHFC Fort Churchill, Manitoba**

CHFC is a tri-lingual station, broadcasting in Eskimo, Indian and English. It serves the immediate area of Churchill and north along Hudson Bay toward Chesterfield Inlet and Coral Harbour. One announcer/operator is Eskimo. The Indian programs

are produced by freelancers living in the area. Most of the students at the Churchill Vocational School come from communities in the Northwest Territories. Broadcasting programs from Frobisher Bay and Yellowknife helps keep them in touch with home.

**INNUKNUT TURRATUT (To the People).** Mondays, 1930-2000 hrs. A program of messages, features and music.

**INOONOOT OOKALEEMAGAT (Eskimo Magazine).** Tuesdays, 1930-2000 hrs. Eskimo. Produced by radio station CFFB Frobisher Bay. In-depth reports and coverage of major news events in the North and elsewhere.

**IKALUIT OQAUSI (Frobisher Calling).** Wednesdays, 1930-2000 hrs. Eskimo. Produced by radio station CFFB Frobisher Bay. Traditional music and folklore.

**INNUIT NUNANITUNUT (Looking North).** Thursdays, 1930-2000 hrs. Eskimo. Produced by radio station CFYK Yellowknife. Features news of the Mackenzie District and the Northwest Territories.

**UQAUSI (Churchill Calling).** Fridays, 1930-2000 hrs. Feature magazine program including community news, traditional folklore and music. Also broadcast on shortwave and by radio station CFFB Frobisher Bay.

**NAHEOW ACHINOOWIN (Good News).** Saturdays, 1400-1500 hrs. Cree. Program takes the form of stories, old Indian jokes, interviews, news translations and music of interest to the Cree people.

**DENAY YELTEE (Chipewyan News).** Saturdays, 1600-1700 hrs. Chipewyan. News and commentary program, includes music.

### **Indian and Eskimo Broadcasts: Radio Station CFYK Yellowknife.**

CFYK is the program centre for the Mackenzie Network consisting of twelve LPRT's (low power relay transmitters) in northern Saskatchewan, northern Alberta and the Mackenzie District of the Northwest Territories. There are six or seven major Indian language groups within the Network area and two Eskimo. English is the common language. For this reason, as much as possible is done to include the special interests of these groups in the locally originated English broadcasts. One announcer/operator is of Indian background.

**COMMUNITY ACTION PROGRAM – NORCAP.** Presently an irregular series of broadcasts produced in co-operation with the Indian-Eskimo Association of Canada. It is a forum for the airing of views on community issues with a view to common action where necessary. Material for these broadcasts is gathered by the Indian-Eskimo Association in the Indian communities, the resulting programs in the English and Indian languages being presented by the CBC Northern Service.

**NEWS IN TRANSLATION.** Saturdays, 1903-2000 hrs. In Slavey, Dogrib, Chipewyan and Copper Eskimo. A weekly summary of news in the Mackenzie Network coverage area.

**GATHER ROUND.** Saturdays, 1430-1600 hrs. In Slavey, Dogrib and English. A program of music requests, messages and features of interest to native people.

**CAMSELL MESSAGES.** Saturdays (twice monthly), 2030-2100 hrs. In Dogrib, Slavey, Chipewyan, Cree, Loucheux and Hareskin. Messages recorded by patients at Charles Camsell hospital, Edmonton, to their families.

**OZONG RENDA (The Good Life).** Mondays, 1930-2000 hrs. In Chipewyan and Dogrib. A program of news, health talks and music.

**INNUIT NUNANITUNUT (Looking North).** Tuesdays, 1930-2000 hrs. Program in Copper and Eastern Eskimo with news, stories and interviews. Also broadcast by radio stations at CHFC Fort Churchill and CFFB Frobisher Bay and over the Northern Shortwave Service.

**KONDEE (News).** Wednesdays, 1930-2000 hrs. In Slavey. Program features health talks, Co-op news and music.

**GOODEE (News).** Thursdays, 1930-2000 hrs. In Dogrib. Program features items of interest to native people and music.

### **Indian and Eskimo Broadcasts**

Radio station CHAK Inuvik is a tri-lingual station, broadcasting in Eskimo, Indian and English. While Loucheux is still widely spoken, the use of Western Eskimo has declined. Broadcasts in these languages are directed more to older people who have little knowledge of English.

**DELTA ROUNDUP** Broadcast twice daily in English, this program is the major vehicle for personal messages between persons in the isolated settlements and the bush, and for local community announcements and news. At each community there are correspondents who provide the station with news of the happenings in their immediate area.

**KOOUNGMUGNAKSIA (Smile-awhile-time)** Saturdays, 1403-1500 hrs. Western Eskimo. A light music request show which includes community events and features.

**TUKUDH KUNDJIK (Between Ourselves).** Saturdays, 1500-1600 hrs. In Loucheux. A light music request show which includes community events and short features.

**PATIENTS' PROGRAM.** Thursdays, 1903-1930 hrs. In English, Western Eskimo, Loucheux and Slavey. Program contains personal messages between patients at the Inuvik Hospital and their families in the Mackenzie Delta.

### **Indian Broadcasts**

Radio station CFWH Whitehorse is the program centre for the Yukon Network serving twelve low power relay transmitters (LPRT's) in the Yukon and northern British Columbia. There is one announcer/operator of Indian background on staff. In language, as well as physically, Indian groups are "hived" off from one another throughout the valley systems in the area served by the Yukon Network. English is the one language they have in common. Their interests are expressed in the local

KLAWOWYA (Hello). Saturdays, 1500-1600 hrs. Mainly in English but distinctively for the Indian audience. Reports from community correspondents make up an important part of this informational and musical program.

## REGIONAL (Montreal)

### WHITEHORSE (CFWH)

21

Indian/Eskimo Nil

#### YELLOWKNIFE (CFYK)

- English Community Action Program — Norcap (Indian and English)  
N.W.T. Council Report  
Mackenzie Sportsreel  
Viewpoint — Panel Discussion  
Answer-Back — open-line program  
Favourite Things — Children's Program  
This Week — Community events  
Focus on Youth  
Territorial Action Centre  
Canadian Music Hour  
Territories Today  
Talking with the Commissioner (also r/o shortwave)  
How It's Done, Canadian Style (also r/o shortwave, CHFC Fort Churchill, CFFB, Frobisher Bay and special N.W.T. Centennial link to amateur radio station VEG — N.W.T.)  
Northern Showcase (also r/o shortwave, tape shipment via Montreal)  
Indian Drums — information program in English of interest and concern to Indians. Content of program gathered throughout the Mackenzie Delta.
- Indian/Eskimo Inuit Nunanitunut — Looking North (Copper and Eastern Eskimo) (also r/o shortwave — tape shipment)  
Ozong Renda — The Good Life (Chipewyan and Dogrib) news, health hints, music  
Goodee — (Dogrib) news, health hints, community events, music.  
Kondee (Slavey) — news, music  
News in Translation — (Dogrib, Chipewyan, Slavey and Copper Eskimo)  
Camsell Messages — (Dogrib, Slavey, Chipewyan, Cree, Loucheux and Hareskin) recorded by patients at Charles Camsell Hospital, Edmonton to their families in the Mackenzie Delta  
Gather Round — (Slavey, Dogrib and English) music, messages and features.

#### INUVIK (CHAK)

- English Delta Sports  
Sunday 27 — Public affairs program  
Delta Roundup  
Mackenzie News  
The Dempster Patrol  
Indian and Eskimo Legends  
The Reindeer Project  
Storytime for Children  
Lions Club Talent Show  
The Cordells — Local live music show  
Chronicle — AM Show  
Northern Showcase (also r/o shortwave — tape shipment via Montreal)

Indian/Eskimo	Kooungmugnaksia – Smile-Awhile-Time – Eskimo request show Tukudh Kundjik – Between Ourselves – Loucheux request show Patients Program – messages in English, Western Eskimo, Loucheux, Slavey, between patients at the Inuvik Hospital and their families and friends in the Mackenzie Delta.
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#### FORT CHURCHILL (CHFC)

English	Hudson Weekly Goes to Press Churchill Newsbeam Public Opinion Churchill Musicale – Local music groups Churchill Roundup School Debates (Thompson, The Pas, Churchill, Flin Flon) Lions Club Carnival Week Songs and Stories for the Young Folk Operation Manitoba – Premier Schreyer's speech to Churchill residents N.W.T. Commissioner's visit to Keewatin District Sportscope Northern Showcase (also r/o shortwave – tape shipment via Montreal)
Indian/Eskimo	Uqausi – Churchill calling (also r/o shortwave) Naheow Achinoowin – Good News (Cree) Denay Yeltee – News (Chipewyan) Innuksut Turratut – To the People (also r/o shortwave)

#### FROBISHER BAY (CFFB)

English	Baffin Island News Roundup Storytime for Children For Women Only Coverage of Governor General's Tour Toonik Time Gordon Lightfoot – Special program Hon. Jean Chretien's visit to Frobisher Eastern Arctic News (English and Eskimo) Northern Showcase (also r/o shortwave – tape shipment via Montreal)
Eskimo	Ikaluit Oqausi – Frobisher Calling (also r/o shortwave – CHFC Fort Churchill) Teterkat – Messages (also r/o shortwave) Inoonoot Ookaleemagat – Eskimo Magazine (also r/o shortwave) Annaight – Ladies' Talk Neejawatit Ikaluinee – Musical hit-parade (also r/o shortwave) Neejawatit Inoonoot – Hard Rock Show Ullasiu – women's features

## HAPPY VALLEY (CFGB)

English	Northern Showcase (also r/o shortwave — tape shipment via Montreal)
	Labrador Winter Carnival
	Home Free
	Sounds Easy
	Regional Roundup
	News and Sports (Regional)
	Calling all Children
	Liberal Convention Broadcast
	Mokamie Mountaineer
Indian/Eskimo	Nil

## Plans for 1970

The CBC Northern Service plans to extend its Mackenzie radio network by building a Low Power Relay Transmitter station at Rae (Edzo), Northwest Territories and is planning for a possible extension to Tuktoyaktuk, Northwest Territories.

The Yukon radio network will be extended by the installation of an LPRT at Faro, Yukon Territory.

Midsummer should see the completion of new studio and office facilities for station CFFB Frobisher Bay.

It will be necessary to relocate the Hay River LPRT because of airport expansion to accommodate jet aircraft.

Dominating program plans in 1970 will be the development of special programs and coverage of centennial festivities and events in the Northwest Territories and Manitoba.

On New Year's Day, a unique network of radio facilities will link together communities in the Northwest Territories for a live, one-hour broadcast from Yellowknife. Similar arrangements will be made for other major N.W.T. events throughout the year, such as the First Arctic Winter Games; the Grand Finale of CBC's Search for Talent contest; the Royal Visit; and on July 15, the 100th Birthday of the Northwest Territories and Manitoba. Coverage of these and other events will of course, be made in Indian and Eskimo languages by the Northern Service, and national attention will be drawn to them by CBC's English and French radio and television networks.

While the Northern Service plans the continuance of a wide range of programs suited to the total audience available, and to different cultural, age and interest groups, particular stress will be given to the further development of consumer information programs, and programs that are broadly or specifically educational in character. Examples of the latter will include dramas in Eskimo depicting conflicts that arise as the people adapt to changing ways of life; discussion programs aimed at stimulating dialogue on ways to create a more meaningful society; the entitlements of the people, more especially those covered by Treaties 8 and 11; and a series on the evolution of Indian and Eskimo societies in North America before the coming of the European.

Further improvements are planned in the daily news coverage of the North for local, territorial and national purposes.

# **CANADIAN NATIONAL RAILWAYS**

## CANADIAN NATIONAL RAILWAYS

### RAILWAY LINE TO GREAT SLAVE LAKE

In 1955 the provision of a railway to the Pine Point area was strongly recommended in a brief presented to the Royal Commission on Canada's Economic Prospects by R. G. Robertson, then Commissioner of the N.W.T.

Legislation authorizing construction of the railway line was introduced in Parliament in June 1961 and received Royal Assent in December 1961.

The railway line extending from Roma in northern Alberta north to Hay River and to Pine Point on the southern shore of Great Slave Lake in the N.W.T. performs three main functions:

- a) provides direct rail service to extensive lead-zinc deposits at Pine Point just south of Great Slave Lake;
- b) provides a railhead at Hay River, general freight traffic to and beyond Hay River, in particular freight moving by barge line down the Mackenzie River system to the Arctic; and
- c) provides rail service to agriculture and lumbering areas in the northwestern part of Alberta traversed by this rail line.

The railway line is 377 miles long between Roma (point of takeoff near Grimshaw) and Hay River, its northern terminus on Great Slave Lake, with a 55-mile branch eastward to Pine Point Mines, making a total of 432 miles.

Volume of freight traffic handled over the Great Slave Branch in 1969 was slightly in excess of one million tons. Of this total tonnage, about 75 per cent was southbound with about 25 per cent northbound. Of the total southbound traffic approximately 85 per cent is mine products, 8 per cent products of agriculture and 7 per cent forest products. Of the total northbound traffic, about 75 per cent is petroleum products.

Freight traffic destined to the railhead at Hay River for furtherance by Northern Transportation Company barges down the Mackenzie River system in 1969 amounted to approximately 90,000 tons.

To sum up, construction of the railway line north to Great Slave Lake has facilitated important new mining developments in the region served by the railway, linked up by rail the transcontinental rail network and barge transportation arrangements on the Mackenzie River system to the Arctic Coast and stimulated agricultural and lumbering activity in the region traversed by the rail line.

# **CANADIAN TRANSPORT COMMISSION**

## CANADIAN TRANSPORT COMMISSION

### AIR TRANSPORT COMMITTEE

#### **Responsibilities**

The licensing of air carriers to operate commercial air services; the economic regulation of air carriers; investigations and surveys relating to the operation and development of commercial air services in Canada and advising the Minister of Transport on matters relating to civil aviation.

#### **Long-Term Plans**

Normal planning to meet responsibilities.

#### **Review of 1969 Operations**

Gap Pine contracts were awarded to Wheeler-Northland Airways Limited and Eastern Provincial Airways (1963) Limited as follows, for the period July 1, 1969 to June 30, 1970:

##### *Wheeler-Northland Airways Limited*

between Frobisher, N.W.T. to Resolution Island

##### *Eastern Provincial Airways (1963) Limited*

between Goose Bay — Cartwright and return  
between Goose Bay — Hopedale and return  
between Goose Bay — Saglek and return  
between Goose Bay — St. Anthony and return  
between Goose Bay — Stephenville and return

With regard to DEWLine contracts the vertical airlift was awarded to TransAir Limited and the lateral to Nordair Limited.

Supervision and coordination of these contractual arrangements continue.

The Committee has continued to deal with applications for additional air services in the North and to provide information on their availability.

#### **Plans for 1970**

Normal planning to meet responsibilities.

# **CENTRAL MORTGAGE AND HOUSING CORPORATION**

## **CENTRAL MORTGAGE AND HOUSING CORPORATION**

### **Responsibilities**

Design of housing, preparation of town development plans, and drafting of planning legislation as requested from time to time by the Department of Indian Affairs and Northern Development.

Financing of housing under the terms of the National Housing Act.

### **Long-Term Plans**

The facilities of the National Housing Act and the services of the Corporation will be made available wherever and whenever they are required.

## **Review of 1969 Operations**

### **Lending Activities**

During 1969, 216 new housing units were financed under the National Housing Act compared with 479 in 1968. Of these, 122 units were in the Yukon Territory and 94 units in the Northwest Territories. While the lenders were not active in the Yukon during 1969 they did provide seven loans for 54 units in the Northwest Territories. All of the units in the Yukon and 40 of the 94 units in the Northwest Territories were financed by Central Mortgage and Housing Corporation.

There were also six loans on existing housing units in the Northwest Territories and a loan was made to the Y.M.C.A. Yukon for 107 hostel beds during 1969.

The first condominium in the North was built during 1969 at Whitehorse. It took the form of 30 row-housing units.

The second mortgage plan provided by the Governments of the Yukon Territory and of the Northwest Territories, as an addition to amounts available under the National Housing Act, continued in operation. The plan is administered by Central Mortgage and Housing Corporation on behalf of the territorial governments. During 1969 two such loans were made in the Northwest Territories and 13 loans were made in the Yukon Territory which brought the total number of loans to 68 since the program began in 1962.

### **Partnership Activities — Yellowknife**

*Land Assembly.* Two land assembly projects have been undertaken in the town of Yellowknife.

The first project, consisting of 67 residential lots and a four-acre multiple housing site is located southwest of the existing built-up area and is known as the 57th Street project. In this project, 48 single family dwellings and 24 multiple housing units have been constructed for employees of the Northwest Territories Government. The financing of most of the dwellings was in the form of NHA loans.

The second land assembly project, located east of the Town in an area known as the "School Draw" consists of 142 residential lots and three multiple housing sites. While arrangements were made to dispose of some of the lots in 1968, the official sales program commenced in November 1969. Twenty-nine lots have been sold. On one of the multiple housing sites, construction of a 100-unit highrise building proceeded on schedule for completion early in 1970. Occupancy of the suites commenced the beginning of October.

*Public Housing – Senior Citizens.* In the spring of 1969, tenders were called and a contract was awarded for a project to house elderly persons on a site adjacent to the old St. Patrick's School at 52nd Street and 52nd Avenue. The building design, which provided for 17 bachelor units with a common lounge, was prepared by Central Mortgage and Housing Corporation. The suites were completed and ready to be handed over in early January 1970.

*Public Housing – Low-Income Families.* In September 1969 a contract was awarded and by year-end construction was underway (10 per cent) on a project of 20 three-bedroom and four four-bedroom back-to-back housing units for rental to families of low income. The building design was prepared by Central Mortgage and Housing Corporation. The estimated date of completion is September 1970.

At the request of the Town Council, an investigation was started for another public housing project of approximately 36 units for families of low income. The potential site for such a project is in the process of being investigated.

#### **Partnership Activities – Hay River**

*Public Housing – Low-Income Families.* Central Mortgage and Housing Corporation designed and called tenders for a project of 20 three-bedroom detached houses for rental to families of low income. A contract was awarded in early summer and the dwellings were ready for occupancy mid-December.

#### **Partnership Activities – Inuvik**

*Public Housing – Low-Income Families.* Tenders were called for a 36 unit three-bedroom project for families of low income. This project, which was designed by Central Mortgage and Housing Corporation, will consist of 5 two-storey blocks built on wooden piles and will be serviced by the existing utilidor system. A contract was awarded in November and a start was made on the foundation work. The date of completion is estimated to be October 1970. A second project is now under investigation in the area.

#### **Partnership Activities – Fort Smith**

*Public Housing.* Approval was given for the investigation of a project for senior citizens and a project for families of low income. These were deferred pending further information concerning the availability of suitable sites.

### **Research Grants and Studies under Part V, NHA, 1954**

The Corporation continued its support of a program of research being carried out by the Centre for Settlement Studies at the University of Manitoba on the problems of settlements which have been developed on Canada's northern frontier as a result of resource development.

### **Plans for 1970**

Approved projects and investigations will be proceeded with as requested by the Northwest Territories Government.

# **CROWN ASSETS DISPOSAL CORPORATION**

## **CROWN ASSETS DISPOSAL CORPORATION**

### **Responsibilities**

The Corporation is responsible for the sale of government-owned assets declared surplus by government departments and agencies operating in the North.

The Corporation is also responsible for the sale of United States government-owned property located in northern Canada as covered by the provisions of Canadian Note 140, dated August 28, 1961 and United States of America Note 52, dated September 1, 1961.

### **Long-Term Plans**

Planning and co-ordination with Canadian government departments and agencies to provide service and assistance for the economical sale of surplus government-owned assets as well as providing liaison and assistance to the United States federal agencies on the handling of their surplus requirements resulting from their operations in the far north.

### **Review of 1969 Operations**

The Corporation was successful during the year of disposing of, by sale, all surplus government assets declared to it in the Yukon Territory, Districts of Mackenzie, Keewatin and Franklin.

The Corporation carried out the sale of all surplus United States property declared to it along the DEWline sites. The recovery from sales made for the current year, on behalf of the Canadian and United States governments, has maintained a consistent level with previous year.

### **Plans for 1970**

The Corporation has programmed a sales plan with the United States authorities for the sale of surplus assets they generate along the DEWline sites in the coming year. These sales are scheduled and carried out as a once per year activity over a short period of time, whereas surplus generated by the Canadian government departments and agencies in on a year-round basis.

Representatives of the Corporation will continue to carry out an inspection and sales tour primarily along the Alaska Highway.

# **DEPARTMENT OF AGRICULTURE**

## DEPARTMENT OF AGRICULTURE

### Responsibilities

To evaluate the physical and economic potential for agriculture in Northern Canada; advise other government agencies on matters related to agriculture in the North; study the biology, distribution, and systematics of northern insects, plants and soils.

### Long-Term Plans

To continue agricultural research at the Experimental Farm at Fort Vermilion and at other locations as required; continue soil surveys and botanical and entomological collections; study agro-climatic relationships; provide agricultural data as required by other government agencies.

### Review of 1969 Operations

Experimental work was continued at the Experimental Farms at Mile 1019, Alaska Highway, at Fort Simpson, N.W.T., and at Fort Vermilion in Northern Alberta. Development continued at the new summer field station at Grand Detour in the Slave River Lowlands and the experimental program progressed satisfactorily.

Work continued on assessing and correlating soil survey data obtained in previous years but no new surveys were conducted. Work also continued on previously collected botanical material for the flora of the Northwest Territories.

One scientist spent two months in the Great Bear Lake area making collections of insects and plants. The grasshoppers from this subarctic area are of interest for the distribution of species and complements the 1966 material from Bathurst Inlet.

One scientist continued investigation of the Chironomidae (*Diptera*) of Char Lake, Cornwallis Island, spending five weeks at this station. This study is part of Canada's contribution to the International Biological Program.

### Plans for 1970

Research will continue at Fort Vermilion and at the summer field station on Slave River. Operation of the Fort Simpson Farm will be transferred to the Northwest Territorial Government. The Farm at Mile 1019, Alaska Highway, will be closed. Both establishments have served their purpose of providing the basic information on which to evaluate the agricultural potential of the areas served. In neither area has there been any development of commercial agriculture.

Work will continue on insect collections made in previous years but no new collections will be made. One scientist will spend two months making botanical collections in Alaska as a complement to collections made in the Yukon Territory.

# **DEPARTMENT OF COMMUNICATIONS**

## DEPARTMENT OF COMMUNICATIONS

### Responsibilities

The Department of Communications was established to foster the orderly development and operation of communications for Canada in the domestic and international sphere. This includes: the stimulation, development and introduction of new communication systems, facilities and resources; the extension of telecommunication systems and services to obtain optimum benefits for Canada in the short and long term; protection and sustenance of Canadian interests in international telecommunication systems, services and undertakings; and the availability of the radio frequency spectrum to permit the orderly development and growth of radio communications.

The North is an area to which the Department is devoting particular attention by studying the needs for telecommunication services, by researching systems to meet those needs and by coordinating, regulating and fostering their implementation. Public systems are constructed and operated by commercial communication companies. Private systems are established also to meet the special needs of their owners.

### Long-Term Plans

The aim of the Department is to have communication frontiers extended northward so that the quality of service may be equivalent to that enjoyed in southern Canada. Research will be undertaken to determine optimum technical solutions. Programs involving public and private investment will be encouraged and arranged. Of major significance in the long term are plans for a Canadian Domestic Satellite System. The principal benefit of the Domestic Satellite System is that live television will be brought to remote communities in the North by Telesat Canada and the Canadian Broadcasting Corporation. The satellite will also permit expansion in the telephone service, particularly when new major resource developments occur and sudden demands for a large number of circuits arise. Through research effort, it is planned to design a portable telephone and television ground station for use with future satellite systems. These satellite stations are being planned for operation on short notice to provide a few reliable circuits to small communities.

A new terrestrial telecommunication system will be completed through the Yukon to the Mackenzie Delta using microwave and tropospheric scatter systems. This system will be established between Whitehorse and Inuvik in December 1970.

A feasibility study of direct broadcasting from satellites has been carried out. Such a system probably will not be realized until the late 1970's because there are problems that will require international resolution. Direct broadcasting to community antenna systems or, alternately, to individual homes in small communities would achieve the ideal of live television coverage for the Canadian population as a whole.

### Review of 1969 Operations

Continued financial support was rendered to the Canadian National Telecommunications for their Mackenzie River poleline system, making possible a

substantial expansion in telephone telecommunication services at Yellowknife, Fort Simpson, Fort Norman, Wrigley and Inuvik.

In the Eastern Arctic, the Department of Communications continues to operate a tropospheric scatter terminal to provide a number of services to Frobisher Bay from southern Canada.

Bell Canada installed new exchanges at Whale Cove, Repulse Bay, Davis Inlet, Makkovik, Postville, Hopedale and Arctic Bay. Canadian National Telecommunications officially opened a new telecommunications building at Yellowknife and installed a 2,000-line telephone exchange. Local exchanges were established at Port Radium and Fort Franklin. A 300-line satellite exchange was commissioned at Hay River.

In the Yukon a VHF radio system having a capacity of 36 channels was installed between Berdoe and Faro, and a 240 line exchange completed. Exchanges at Lower Whitehorse and Porter Creek were expanded to 2,300 and 200 lines respectively.

During 1969 Telesat Canada took over responsibility from the Department of Communications for the implementation of the Canadian Domestic Satellite System. Contract awards for satellite and ground stations will be let shortly by the Corporation.

#### Plans for 1970

A major communications conference is planned in Yellowknife between September 9 and 11, 1970. The conference will be sponsored by the Department of Communications, the territorial governments, the Department of Indian Affairs and Northern Development, the communications industry, and the university community. Doctor John J. Deutsch, President of Queen's University will be the conference chairman.

The purpose of this conference will be publicly to review problems of communication in the northern part of Canada, and to use this as a means of developing policies so that communications services can be extended in the most efficient manner possible. Because these problems are peculiar to the North, it will be held at Yellowknife so as to coincide with the Centennial of the Northwest Territories. The participation of those who will be most immediately affected by new communication systems will be encouraged as much as possible. The conference is intended to accommodate about 150 people, including senior representation from Canadian industry, the academic community and government.

As an integral part of telecommunication studies, a special study will be completed this summer concerning communications and northern development. It will be a joint government-industry study and it will describe the nature of communication user requirements in the North, the availability of technological means to meet user requirements, and the formulation of system plans to consolidate services presently provided in the North by a multiplicity of different agencies.

The Department of Communications has designed a comprehensive HF network for northern Manitoba to be implemented by the Manitoba Telephone System on behalf

of the Department of National Health and Welfare. Similar networks are planned for northern Ontario and northern Saskatchewan to support essential health services.

Communication tests were conducted using military satellite systems for a point-to-point connection between Churchill and Resolute, and for air-to-ground contact between aircraft and a satellite terminal at Churchill.

Bell Canada intend to install private toll stations at Port Burwell, Eastmain, Belcher Islands, Lake Harbour, Clyde River, Broughton Island, Fishing Ships Harbour, Pinsent Arm, Snug Harbour and Williams Harbour. New exchanges are planned at Grise Fiord, Saglek and Payne Bay.

Canadian National Telecommunications will establish a new radio system having a capacity of 60 telephone circuits between Yellowknife and Hay River. Demands for increased circuits have necessitated the removal of the existing system and its replacement by a higher capacity installation. A further 600-line expansion to the Yellowknife exchange is planned, and a VHF mobile station will be installed.

An additional 10-voice channel will be added between Port Radium and Hay River. The Fort Smith exchange will be expanded by 100 lines. Service to Coppermine will be upgraded by the completion of an intermediate repeater station at Locker Point.

A new UHF radio system having a capacity of 60 channels will be installed between Inuvik and Tuktoyaktuk in December 1970. Base stations for mobile communications are planned at Parsons Pond, Tuktoyaktuk, Aklavik, Fort McPherson and Arctic Red River. Local telephone exchanges at Aklavik, Fort McPherson, Tuktoyaktuk and Fort Resolution will be increased by 50 line additions. Long distance telephone circuits between Hay River and Edmonton will be increased from 28 to 33. In addition four direct Hay River-Calgary circuits will be put into service. Inuvik and Hay River trunk circuits will be increased from five to seven. Two direct trunk circuits between Edmonton and Inuvik, to make a total of nine, will be completed in 1970.

**DEPARTMENT OF ENERGY  
MINES AND RESOURCES**

**DEPARTMENT OF ENERGY, MINES AND RESOURCES**  
**GEOLOGICAL SURVEY OF CANADA**

**Responsibilities**

The Geological Survey of Canada maintains and coordinates mapping, detection interpretative, research and advisory capabilities in geological sciences, including mineralogy and paleontology, and in complementary aspects of geophysics, geochemistry, and physical geography, together with the support of other disciplines: 1) to provide a comprehensive, descriptive and interpretative national and regional inventory of formations of rocks and surficial materials, their structures, contained minerals, containing landforms and conditions of stability; and 2) to develop concepts and techniques in order to maintain the standard of the inventory in conformity with national requirements, to increase the usefulness of the inventory and effectiveness in the exploration of earth resources and in contending with the physical environment.

**Long-Term Plans**

It is expected that the proportion of Survey funds and effort spent north of the 60th parallel will continue to increase.

The preliminary reconnaissance study and mapping (mainly 1 inch to 8 miles and 1 inch to 4 miles) will continue to receive high priority until completed a few years hence.

Aeromagnetic surveys made by or for the Geological Survey are a supplementary method of obtaining reconnaissance geological data. It is expected that surveys of the following regions will be completed, or very nearly so, at various times before the end of 1976: Yukon Territory south of the 66th parallel; the mainland Canadian Shield in Districts of Keewatin and Mackenzie; and most of Baffin Island. Aeromagnetic maps of most of the Polar Continental Shelf and the Sverdrup Basin will be published about the same date.

When this reconnaissance program ends, first priority will be given to upgrading the reconnaissance maps and reports. This will be done where and as required to achieve as nearly as practicable a fully three-dimensional understanding of all geological features for publication at modern 1 inch to 4 mile standards. It will be accomplished by the selective application to map-areas or groups of map-areas of those methods and disciplines (conventional geological mapping, geophysics, geochemistry, etc.) most applicable to local problems and conditions. Completion of this program may take several decades.

Increased emphasis will be placed on the study of mineral deposits and their environment as a means of developing criteria, concepts and techniques needed to assess mineral potential and guide mineral exploration.

**Review of 1969 Operations**

About 44 field projects, including aeromagnetic surveys by contract, were carried out in the Canadian North in 1969. Some 10 of these were in Yukon Territory the

remainder being on the mainland of the Northwest Territories and on the islands of the Arctic Archipelago. Preliminary results of these studies have been published in the Geological Survey's "Report of Activities, April to October 1969" (G.S.C. Paper 70-1, Part A) released 15 January 1970.

Lignite coals were examined in various parts of the Yukon Territory as part of a study of the radioactivity of Tertiary lignites in Western Canada. The coal deposits at Carmacks were also examined as part of a study to evaluate the potential of this area, and samples were collected for petrographic study to assist in seam correlation.

A study was begun of the areal variability of granitoid intrusives of eastern Yukon and the relationships of these rocks to tungsten mineralization. Preliminary results indicate that there are mappable variations and that these can be related to possible mineral potential.

Studies were continued of stream sediment deposits and granitic bodies and associated molybdenum, tungsten and base-metal occurrences along the Cordilleran tin belt. In Yukon Territory, the areas examined were the upper Hess River and parts of Tintina Trench west of McQuesten district.

In order to identify, characterize and determine the genesis of certain soils as a means of reconstructing ancient climates and to aid in determining the Quaternary history of central Yukon Territory, detailed sampling and other studies were made at six sections off the highway between Dawson and Stewart Crossing.

Studies on mass wasting processes in Wernecke and Ogilvie mountains were completed.

Geological mapping, carried out in the Bonnet Plume area, extended into the District of Mackenzie. The 1969 work concentrated on a study of the major sedimentary and tectonic features. No new mineral occurrences were found. The host rocks of the Amax tungsten deposit, nine miles southeast of Keele Peak, appear to be correlative with those at the Canada Tungsten Mine, a fact of some interest to prospectors.

Several helicopter-supported geological reconnaissances were carried out in the Northwest Territories, the two largest areas covered being parts of the western District of Mackenzie and Southampton Island.

Operation Norman, a three-season project begun in 1968, which will cover 145,000 square miles between 64°N and the Arctic Coast and 119° and 132°W, combines bedrock mapping, stratigraphic studies and investigations of surficial deposits. The 1969 work was in the Mackenzie Mountains, the Mackenzie Valley, the McConnell Range and the plains south of Great Bear Lake. In the Mackenzie River valley there is evidence that compressive deformation continued into the Tertiary, whereas south of Great Bear Lake the last significant deformation was pre-Cambrian. In Mackenzie Mountains the last orogenic movement appears to have been pre-Middle Cambrian; pre-Tertiary, pre-Cretaceous, pre-Devonian and pre-Upper Ordovician uplifts were epeirogenic. Faulting has affected the area and many of the faults, although originally formed in Cambrian time, appear to have been reactivated as late as Upper Devonian time. Although diabase dykes and sills intrude Precambrian strata, no metallic minerals of economic significance were noted.

Reconnaissance geological, mapping of Southampton Island was carried out using a Bell 47 B-2 helicopter for traversing. The island is underlain by Precambrian and Paleozoic rocks. The former rise gradually from sea level at the south end of the island to a high plateau in the north which is commonly bordered by steep fault-scarp cliffs. The Precambrian rocks comprise massive to foliated granitoid rocks, migmatite, gneiss and paragneiss. The structural trend is northeasterly to east. Traces of molybdenite were found in rusty graphite-rich zones on Bell Peninsula and molybdenite was also seen in pegmatite dykes in the Terror Point and Cape Welsford areas. Paleozoic rocks, which occupy the southern and western parts of the island, are lithologically similar to those of the Hudson Bay Lowlands. Carbonate rocks dominate the succession and in some units biohermal reefs are extensive. Such features, if found at subsurface and at sufficient depth, could be potential oil and gas horizons. A seven-foot-thick highly petroliferous shale unit occurs near the base of the Paleozoic sequence and may warrant future exploration. Although no metallic mineral deposits were found it appears that the major fracture systems, developed by post-Silurian uplift of Precambrian strata, should be examined for possible base metal deposits. Such fractures are best developed along the Paleozoic-Precambrian contact.

The geological reconnaissance of eastern Devon Island was continued using motor toboggans for transport. The area is composed of grey granitic gneiss that is usually well foliated. No deposits of economic interest were seen.

Stratigraphic and structural studies were carried out between Mackenzie Delta and Barn Mountains. The sedimentary succession is highly variable laterally and vertically and is punctuated by a series of orogenic deformations, uplifts and periods of erosion. It is characterized by ovate domes and long north-trending folds bounded or cut by near-vertical faults. The hydrocarbon possibilities are promising and there are several potential horizons of both Paleozoic and Mesozoic age.

As in 1968, considerable interest centred on the Coppermine River area.

Mapsheets 86 O and N, an area of about 7,500 square miles, were mapped. A hitherto unreported copper showing was found near the base of the uppermost late Precambrian succession. Mineralization is widespread in a succession of mudstone, siltstone, sandy siltstone and silty pebble conglomerate seven miles northwest of the junction of Husky Creek and Coppermine River. Chalcopyrite, bornite, and chalcocite are the principal metallic minerals and are most abundant ten to fifty feet above the unconformity separating these rocks from the Coppermine River Group. The showing is an indication that sedimentary copper ores may occur in other parts of the post-Coppermine River Group rocks.

A preliminary study was made of the feasibility of geochemical surveys as an exploration tool for locating copper deposits in regions of permafrost. This work was carried out 42 miles southwest of the settlement of Coppermine. Preliminary data indicate that there is active dispersal of Cu from known deposits and that there is much potential for the development of geochemical prospecting techniques in permafrost regions.

A study of the Epworth Group of Proterozoic sedimentary rocks in the Coppermine area was begun. Among the objectives of the work is an assessment of the

probability of occurrence of stratiform copper or lead-zinc mineralization of the Mississippi Valley type and an evaluation of the use of stromatolites for long-range biostratigraphic correlation. Several formations which have potential for the occurrence of base metal deposits were outlined.

A further study of one aspect of the well-known Muskox Intrusion was made which showed that dolomite and basalt associated with the intrusion are in fact younger than the emplacement of the pluton. Thus it appears that the Muskox Intrusion is older than the basalt of the Coppermine River Group and has no genetic relationship to it.

Field studies in Precambrian geology were carried out in other parts of the District of Mackenzie. Mapping of Artillery Lake map-area for publication at a scale of 1:250,000 was completed. The area is of interest because of current prospecting in areas along the Thelon Front (the boundary between the Slave and Churchill structural provinces of the Canadian Shield). Helicopter traverses were supplemented by ground work. Many claims have been staked in the past two years — most lie along the trend of magnetic anomalies which in turn parallel the Thelon Front.

A study of the Proterozoic Nonacho Group south of Great Slave Lake was continued. This project is designed to study the stratigraphy, structure, and sedimentary petrology of the rocks to correlate them with similar rocks in the region and to determine their age relationships with adjacent metamorphic and igneous rocks. A number of uranium showings and copper prospects have been discovered; most are in basement rocks near their contact with Nonacho sediments and are found in shear and breccia zones. In addition to looking for such features the possibility that the Nonacho Group contains relict placer deposits should be considered.

Several projects were carried out west of Hudson Bay. A study of the Precambrian Hurwitz Group of sedimentary rocks between Rankin Inlet and Wallace River was continued as was reconnaissance mapping of Ennadai Lake and Nueltin Lake map-areas. No mineral occurrences of economic interest were discovered in the latter area although many conglomerate exposures were tested for radioactivity.

Eskimo Point and Dawson Inlet areas, a region that covers the southern part of the northeast end of Ennadai-Rankin Inlet greenstone belt, were also mapped. The belt contains extensive linear, high aeromagnetic anomalies caused by sedimentary iron-formation. An annular magnetic anomaly similar to anomalies associated with alkalic plutons and carbonatites and thus a possible source for rare-earth minerals, was examined. A similar pluton on the northeast side of Kaminak Lake was found in 1968.

A study of more recent geological features within the Northwest Territories also received considerable attention. Peat deposits and fossil mosses from Banks Island were examined. The Quaternary geology west of Mackenzie River, in particular the upper limit of Laurentide glaciations and the extent of former valley glaciers that originated in the Mackenzie Mountains, was studied. Organic deposits, from a few feet to ten feet thick, are widespread in the valleys and plains of the area and permafrost underlies almost all parts. A study of the proglacial geomorphology of

Generator Lake, central Baffin Island, was continued. Samples were collected for further radiocarbon dating. Geomorphological studies were continued on Banks Island and along the Mackenzie Valley and Arctic Coast.

An investigation was begun of erosion in a permafrost environment. In this study attempts are being made to assess the importance of surficial material, geomorphology, snow cover, vegetation, depth of active layer, ground ice distribution, and other factors. Observations made last summer were limited to the site of the 1968 Inuvik forest fire. Although the fire itself had no effect on the thickness of the active layer, the removal of the surface organic layer has caused a nine inch increase in the thickness of the active layer.

In 1969 3,555 line miles of aeromagnetic survey was completed in northern Baffin Island and 25,000 line miles in central Baffin Island south of the DEWLine.

*Appendix A* lists items published by the Geological Survey in 1969 dealing with Yukon Territory and the Northwest Territories.

#### Plans for 1970

Active scientific projects for 1970-71 specifically concerning the Yukon Territories and Northwest territories will number about 120. About 80 will be specifically concerned with the Northwest Territories, 20 with Yukon Territory and 20 with both Territories. Many of these, however, will be active only in the office and laboratory components required to study, interpret and prepare the results of previous field work for publication. Thus, those that will be active in the field during part or all of the 1970 field season comprise only a part of the above total scientific program, and number approximately 50. Some 37 will involve field work in Northwest Territories, seven in Yukon Territory, and seven in both Territories. These figures include aeromagnetic surveys to be made by contract in all districts of Northwest Territories.

*Appendix B* describes most of the above preliminary total scientific program for Northwest Territories and identifies those projects that will have field parties.

*Appendix C* does likewise for Yukon Territory.

The principal projects involved will:

- a) contribute to the early completion of the preliminary reconnaissance mapping of bedrock and surficial geology and the federal-provincial aeromagnetic programs;
- b) provide more adequate data within areas of high current or near-future commercial activity; and
- c) develop criteria and techniques to guide northern prospecting.

A group of about seven parties will be on the Melville-Cornwallis-Devon-Ellesmere-Prince of Wales group of islands. These include a major project to follow up previous reconnaissance mapping of the Paleozoic strata of Prince of Wales Island on the western flank of a major structural feature known as the Boothia Arch; and the reconnaissance investigation of the surficial geology of Devon Island, one of the main gaps of knowledge in this phase of geology of the Arctic Islands.

Aeromagnetic surveys will be continued from 1969 and will probably be completed in northern and central Baffin Island, thereby completing surveys on the Island between the 66th parallel and the 80th meridian. The other main project there will be Operation Penny Highlands, a helicopter-supported reconnaissance survey of the bedrock and surficial geology of the central part of the Island north from the Arctic Circle. This will complete the reconnaissance geological investigation of the Island.

Southern District of Keewatin and adjacent District of Mackenzie will continue to be an area of concentrated work as required by the continued commercial search for uranium and other metals extending northeasterly from Saskatchewan. Aeromagnetic surveys, as part of a six-year contract negotiated and started in 1969, will be continued. Ground investigations will include completion of mapping of some 11,000 square miles in the extreme south and seismic, geochemical, volcanic and stratigraphic studies, all needed for effective prospecting.

About four parties in the Great Bear Lake-Coppermine-Bathurst Inlet area will continue to provide guides to the search for copper deposits by studying the known deposits, the sedimentary rocks associated with the copper-bearing lavas, and testing and demonstrating methods of geochemical prospecting devised during 1969 for use in this and similar permafrost areas.

A concentration of bedrock and surficial geology parties, similar to that of 1969, will be maintained in the Mackenzie Delta-Arctic coastal plain/lower Mackenzie River Region in response to the needs of accelerating oil and gas activity. The reconnaissance of the bedrock and surficial geology between Great Bear Lake and the Yukon border will be completed by the final phase of Operation Norman.

Of some eight parties in Yukon, one will complete the reconnaissance mapping project, Operation Stewart, started in 1969. The reconnaissance of the northern half of the Territory, including the Arctic Plateau and the Coastal Plain, will be refined by another. The regional geochemical census of plutonic rocks in southeastern Yukon will be continued from 1969 to provide closer guidance for prospecting, and a start will be made on the study of the geology of the Dawson Range in the vicinity of the "porphyry copper" deposits now under exploration.

## APPENDIX A

G.S.C. reports and maps issued in 1969 dealing with  
Yukon Territory and Northwest Territories:

### Bulletins

Chamney, T.P.

*Barremian Textulariina, Foraminiferida from Lower Cretaceous beds, Aklavik Range, District of Mackenzie*, Bull. 185.

Dineley, D.L.

*Osteostraci from Somerset Island*, Part II of Bull. 165.

McLearn, F.H.

*Middle Triassic (Anisian) ammonoids from northeastern British Columbia and Ellesmere Island*, Bull. 170.

Robertson, W.A.

*Magnetization directions in the Muskox Intrusion and associated dykes and lavas*, Bull. 167.

Trettin, H.P.

*Pre-Mississippian geology of northern Axel Heiberg and northwestern Ellesmere Island*, Bull. 171.

Trettin, H.P.

*Lower Paleozoic sediments of northwestern Baffin Island*, Bull. 157.

Norford, B.S., et al

*Contributions to Canadian Paleontology*, Bull. 182; (a collection of 11 papers dealing with northern and western areas).

### Papers

Bamber, E.W. and Barss, M.S.

*Stratigraphy and palynology of a Permian section, Tatonduk River, Yukon Territory*, Paper 68-18.

Blusson, S.L.

*Geology and Tungsten deposits near the headwaters of Flat River, Yukon Territory and southwestern District of Mackenzie*, Paper 67-22.

Bostock, H.S.

*Kluane Lake, Yukon Territory, its drainage and allied problems*, Paper 69-28.

**Findlay, D.C.**

*Mineral Industry of Yukon Territory and southwestern District of Mackenzie*, 1967, Paper 68-68.

**Gabrielse, H. and Blusson, S.L.**

*Coal River map-area, Yukon Territory*, Paper 68-38 accompanied by Map 11-1968.

**Hughes, O.L., et al**

*Glacial limits and flow patterns, Yukon Territory*, Paper 68-34 accompanied by Map 6-1968.

**Mountjoy, E.W. and Chamney, T.P.**

*Lower Cretaceous (Albian) of the Yukon: Stratigraphy and foraminiferal subdivision, Peel and Snake Rivers*, Paper 68-26.

**Nassichuk, W.W. and Christie, R.L.**

*Upper Paleozoic and Mesozoic stratigraphy, Yelverton Pass area, Ellesmere Island*, Paper 68-31.

**Petryk, A.A.**

*Mesozoic and Tertiary stratigraphy at Lake Hazen, northern Ellesmere Island*, Paper 68-17.

**Sasaki, A.**

*Sulphur isotope study of the Muskox Intrusion, District of Mackenzie*, Paper 68-46.

**Stott, D.F.**

*Ellef Ringnes Island*, Paper 68-16 accompanied by Map 4-1968.

**Tremblay, L.P.**

*Preliminary account of the Goulburn Group, Northwest Territories*, Paper 67-8.

**Thorsteinsson, R. and Kerr, J.Wm.**

*Cornwallis Island and adjacent smaller islands*, Paper 67-64 accompanied by Map 25-1967.

**Yorath, C.J., Balkwill, H.R. and Klassen, R.W.**

*Geology of the eastern part of the Northern Interior and Arctic Coastal Plains, N.W.T.*, Paper 68-27.

**Final Maps (A-Series)**

**McGlynn, J.C.**

*Tumi Lake, District of Mackenzie,*  
Map 1230A.

**Mulligan, R. and Taylor, F.C.**

*Hill Island Lake, District of Mackenzie,*  
Map 1203A.

**Preliminary Maps (in addition to those accompanying Papers)**

**Cook, D.G. and Aitken, J.D.**

*Fort Good Hope, District of Mackenzie,*  
Map 4-1969.

**Aitken, J.D. and Cook, D.G.**

*Lac Belot, District of Mackenzie,*  
Map 6-1969.

**Cook, D.G. and Aitken, J.D.**

*Erly Lake, District of Mackenzie,*  
Map 5-1969.

**Yorath, C.J. and Balkwill, H.R.**

*Crossley Lake, District of Mackenzie,*  
Map 8-1969.

**APPENDIX B**

**GEOLOGICAL SURVEY OF CANADA  
PRELIMINARY SCIENTIFIC PROGRAM  
NORTHWEST TERRITORIES  
1970-71**

# FRANKLIN, KEEWATIN AND MACKENZIE

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
500336	Devonian of Alberta, British Columbia and southern District of Mackenzie	Belyea, Helen R.	ISPG	SP	Mack.	Pts 72, 73, 74, 82, 83, 84, 85, 94, 95.
	Obj.: To publish a series of papers on the Devonian discussing rock types, correlations, facies changes, disconformities, faults, etc., in an attempt to elucidate the reasons for Devonian facies distribution and hence designate general areas of potential hydrocarbon reservoir rocks.					
540027	Mineral industry of the mainland Northwest Territories	McGlynn, J. C. and Thorpe, R.I.	Adm	Ch.G.	Kee. & Mack.	55, 56, 65, 66, 75, 76, 85, 86.
	Obj.: To secure information and prepare for publication reports on the mineral industry of the mainland Northwest Territories as a contribution to economic development.					
580003	Belcher Islands, N.W.T.	Jackson, G.D.	CG	PS	Kee.	33 NW, 34 SW.
	Obj.: To determine the depositional environment, stratigraphy, age and structure of the rocks of the islands. Publication at 1"-2 miles or more detailed as required.					
590283	Muskox intrusion	Irvine, T.N.	CG	Pet	Mack.	86 D/3J/14, 11, 16, 7, 3, 2, 0/3.
	Obj.: A chemical, petrographic and mineralogical study of the Muskox intrusion with the purposes of describing its crystallization history, relating it to events of basaltic magmatism in the Coppermine province and defining its significance in relation to the general origin of layered intrusion.					
600002	Operation Back River	Heywood, W.W.	CG	PS	Kee.	56 J-O, 66 L-K, N-P, Pts 57, 67.
	Obj.: To map and study the bedrock geology of a previously unstudied terrain describing the general, structural, historical, and economic geology features of the area as a basis for future economic development of northern Canada.					

Asterisk in first column in the pages of this Appendix indicates project has a field component.  
 Brackets indicate seasonal employee or other non-staff. Underscoring indicates location of 1970-71 field work

500004	Regional correlation – northwest Canadian Shield	McGlynn, J.C.	CG	PS	Mack.	86 C/15 E <sup>1</sup> / <sub>2</sub> ; 85 B/13; 86 B/12 E <sup>1</sup> / <sub>2</sub>
	Obj.: A stratigraphic and structural study of the Snare and Cameron Bay strata, as a contribution to the correlation and interpretation of the Proterozoic rocks of the N.W.T. The publication's scale will be one inch to one mile.					
610002*	Axel Heiberg and Ellesmere Island	Thorsteinsson, R.	ISPG	AI	Frank.	560 A,D; 340 A,B,C; 120 B,C; 49 C-H; 39 G-H
	Obj.: 4-mile mapping of post – Precambrian bedrock formations; to provide information on the age, structure, sequence, relationships, thickness and origin of the bedrock formations; and to assess the economic potential of the area of study.					
610007*	Operation Porcupine	Norris, D.K.	ISPG	SG	Mack. & Yk.	106; 107; 116; 117
	Obj.: Reconnaissance mapping of potential oil and gas region.					
610019	Ordovician and Silurian biostratigraphy of British Columbia, Alberta, Yukon, Mackenzie, and Franklin	Norford, B.S.	ISPG	WP	Frank., Mack., Yk., B.C. & Alta.	—
	Obj.: Establishment of sequence of biochronological zones for Ordovician and Silurian time.					
610044	Diabase dykes of the Canadian Shield	Fahrig, W.F.	CG	PS	Kee, Mack., Sask., Man., Ont., Que., & Nfld. (Lab.)	—
	Obj.: To extend knowledge of diabase dyke swarms in the Canadian Shield, their tectonic significance, palaeomagnetism, age relationships and their chemical and petrologic characteristics.					
620004	Kognak River area, N.W.T.	Eade, K.E.	CG	PS	Kee.	65 G E <sup>1</sup> / <sub>2</sub> , H W <sup>1</sup> / <sub>2</sub>
	Obj.: Mapping of the area for publication at 1"–4 miles with special study of the stratigraphy and structure of the Hurwitz Group and its relationship to nearby rock sequences, as an aid to economic development in the region.					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
620012	Geochemical and petrologic study of Yellowknife volcanic rocks  Obj.: To provide composition, petrographic, and stratigraphic data from which the volcanic character, eruptive history, and characteristic composition may be obtained.	Baragar, W.R.A.	CG	PS	Mack.	85 J/8, 9
630003	Operation Grant Land' NE Ellesmere Island and NW Greenland  Obj.: To obtain a better understanding of the geological features of an orogenic belt extending across northeastern Ellesmere Island to adjacent Greenland.	Christie, R.L.	ISPG	AI	Frank.	120 C-G; 340 C-F, H
630099	Dabawnt Group sediments, N.W.T.  Obj.: To define the units within this group and to determine the provenance, dispersal patterns and depositional environments of its constituent sediments.	(Donaldson, J.A.)	CG	PS	Kee. & Mack.	55 NW, 56 SW, 65 N, 66 S, 75 NE, 76 SE
630011	Operation Nahanni  Obj.: Geological study and mapping of the Flat River (95E), Glacier Lake (95L) and Wrigley Lake (95M) map-areas to provide information on the age, structure, sequence, relationships, thickness, and origin of bedrock formations and on the size, grade, mode of occurrence, origin and potential of mineral deposits.	Gabrielse, H.	CG	C & PM	Mack. & Yk.	95 E,L,M
630341	Paleontology and stratigraphy of the Carboniferous and Permian of northern Yukon  Obj.: Stratigraphic and paleontological information obtained on Operation Porcupine will be assembled to present a general picture of the Carboniferous and Permian rocks of the Yukon north of the 65th parallel.	Bamber, E.W.	ISPG	WP	Mack. & Yk.	116 B, C E½, C-J, K E½, N E½, O, P; 117 A-D
630415	Lower Cretaceous (Albian Stratigraphy of Peel and Snake Rivers, Yukon Territory  Obj.: To aid in new stratigraphic interpretations obtained on Operation Porcupine.	Chamney, T.P.	ISPG	WP	Mack. & Yk.	106; 116; 107; 117

640004	Quaternary reconnaissance, western Arctic Islands	Fyles, J.G.	QRG	R & SP	Frank.	Pts 97, 98, 88, 89, 78, 79, 69, 59, 49, 560, 340
	Obj.: To map and explain Quaternary deposits, landforms, and landscape processes in order to: (1) provide areal geological information; (2) determine Quaternary stratigraphy and history; and (3) document the nature and rate of landscape development processes. The project includes investigation of the Beaufort Formation.					
640005	Operation Wager	Heywood, W.W.	CG	PS	Kee.	46 D W <sup>1</sup> / <sub>2</sub> , E, F N <sup>1</sup> / <sub>2</sub> , G N <sup>1</sup> / <sub>2</sub> , I-P; 47 A S <sup>1</sup> / <sub>2</sub> , B S <sup>1</sup> / <sub>2</sub> ; 56 A, B, G, H, I, P; 57 A E <sup>1</sup> / <sub>2</sub> , D E <sup>1</sup> / <sub>2</sub>
	Obj.: To map and study the bedrock of a previously unmapped area, describing the general, structural historical and economic geology features of the area as basis for future economic development of northern Canada.					
64010	Yellowknife and Goulburn rocks in the Contwoyto Lake area, N.W.T.	Tremblay, L.P.	CG	PS	Mack.	75 E/11, 14
	Obj.: To study the metamorphic rocks of the Yellowknife Group with particular reference to petrologic, stratigraphic and/or structural control of ore deposition and to study the stratigraphy of the Goulburn Group in this area for regional comparison and correlation. Publication scale, 1 in. -1 mile.					
640011	Itchen Lake map-area	Bostock, H.H.	CG	PS	Mack.	86 H E <sup>1</sup> / <sub>2</sub> ; 76 E W <sup>1</sup> / <sub>2</sub>
	Obj.: To outline the limits of gold-bearing rocks of the Yellowknife group; to determine the age and structural relations of the Yellowknife rocks and to ascertain the origin of the gold deposits; to complete mapping and structural interpretation of the Proterozoic outlier at "Rockinghorse Lake" to assist in correlation between the Epworth and Goulburn groups. Publication scale 1" -4 miles.					
640443	Late Middle and early Upper Devonian Formations of Manitoba and central Saskatchewan to Great Slave Lake	Belyea, Helen R.	ISPG	SP	Mack. Alta. Sask. & Man.	Pts 62, 63, 72, 73, 83, 84, 85
	Obj.: To attempt a correlation of the Point Wilkins, Dawson Bay, Winnipegosis, Elm Point and Ashern Formations of the Manitoba outcrop area with subsurface formations extending across Saskatchewan to Alberta and Great Slave Lake area.					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
650003	Cornwallis and adjacent smaller islands  Obj.: Geological mapping of Cornwallis Island and smaller islands adjacent to Cornwallis Island to produce geologic maps for publication on a scale of 1 inch to 4 miles to provide information on the age, structure, sequence, relationship, thickness and origin of bedrock formations; to obtain information on size, grade, mode of occurrence, origin and potentialities of any fuel or mineral deposits that may occur in the area of study and to prepare a systematic and morphological study of the Silurian and Devonian ostracoderms of Cornwallis Island.	Thorsteinsson, R.	ISPG	AI	Frank.	58 F, G; 68 E, H
650006	Mode of occurrence and origin of the iron deposits, Mary River, Baffin Island  Obj.: To describe the geology of the Mary River deposits and their immediate environment for the purposes of understanding their origin and genesis as a guide to mineral exploration and to provide a national authority on iron potential in Canada.	Gross, G.A.	EGG	MD	Frank.	48 A SE
650008*	Stratigraphy, sedimentology and correlation of the Nonacho Group, N.W.T.  Obj.: To study the sedimentology and stratigraphy of Nonacho Group and relationships of these rocks to surrounding igneous rocks as a contribution to regional correlation and geological history of the region. This will include mapping of the Nonacho group at 1" to 2 miles and larger scales as required.	McGlynn, J.C.	CG	PS	Mack.	Pts 75 E,F,K
650009	Petrologic and structural study of the MacDonald fault system south of Great Slave Lake  Obj.: To describe and interpret the mylonites north and south of the MacDonald Fault and their relationships to nearby Archaean and Proterozoic rocks; to estimate the order of magnitude and sense of horizontal and vertical components of movement along the MacDonald Fault system; and to evaluate the possible correlation of the Yellowknife Group with highly metamorphosed rocks southeast of the MacDonald Fault.	Reinhardt, E.W.	CG	PS	Mack.	Pts 75 E; 85 H

650010	Operation Selwyn	Gabrielse, H.	CG	C & PM	Mack. Yk. & B.C.	95 D; 105 A,H,I,P; 104 O
<p>Obj.: To establish the stratigraphic sequence and determine the nature of abrupt facies changes in lower Paleozoic rocks of western Mackenzie and Selwyn Mountains, and to study the relationship and distribution of formations that are host to large base metal deposits, as a contribution to the economic development of the north.</p>						
650024*	Cambrian biostratigraphy of the eastern Cordillera	Fritz, W.H.	ISPG	WP	Mack. B.C. & Alta.	—
<p>Obj.: (a) Complete reports on Cambrian fossils which can be used by Survey officers in their compilation and publications. (b) (b) Refine Cambrian biostratigraphy and disseminate results through publication. (c) Keep in close liaison with Survey officers actively working on Cambrian rocks and offer counsel where needed.</p>						
650050	Metallogenic maps and reports, Districts of Mackenzie and Keewatin	Thorpe, R.I.	EGG	MD	Kee. & Mack.	—
<p>Obj.: To contribute to a metallogenic map of Canada (Project 640125) and to prepare a metallogenic map of the District of Mackenzie and Keewatin.</p>						
<p>Remarks: Title changed to include Keewatin and objectives revised.</p>						
660005	Tavani map-area, Keewatin	Heywood, W.W.	CG	PS	Kee.	55 K
<p>Obj.: To study the structure, stratigraphy and metamorphism of the sedimentary-volcanic assemblage of the Tavani map-area with particular emphasis on the petrology and mineral potential of the volcanic rocks.</p>						
560006	Granite studies in the Ennadai-Rankin Inlet region.	Davidson, A.	CG	PS	Kee.	Pts 55 W <sup>1</sup> / <sub>2</sub> , 65 E <sup>1</sup> / <sub>2</sub>
<p>Obj.: To classify the granitic rocks according to age, geological and chemical nature, geophysical parameters where available and to relate them to the regional geology and mineral deposits.</p>						

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
660007	Studies of the Coppermine River volcanic rocks, N.W.T.	Baragar, W.R.A.	CG	PS	Mack.	Pts 86 N, O
	Obj.: To determine the total composition, variation in composiiton, and stratigraphy of the Coppermine River volcanic sucession and its relationships to Mackenzie dyke swarm and Muskox Complex. To provide data of assistance to prospecting.					
660009	A sedimentological and stratigraphic study of the Great Slave and Et Then Groups in the East Arm fold belt, Great Slave Lake	(Hoffman, P.F.)	CG	PS	Mack.	Mainly 75 L
	Obj.: To refine existing stratigraphic descriptions and relationships of the sedimentary and volcanic rocks to determine source regions and dispersal patterns in the sedimentary fill; to determine depositional environments and to reconstruct the Palaeogeographic historic of the sedimentary basin.					
660020	Structural and palaeomagnetic fabric of the Mackenzie Arc	Norris, D.K.	ISPG	SG	Mack. & Yk.	106; 107; 116; 117
	Obj.: Analyse the tectonic history of the northern Cordillera, to establish the sequence of superposed deformations and to assess the control of the initial geometry of the sedimentary basins of the depositional and tectonic history of that area.					
660042*	Regional aeromagnetic – geologic correlation	Kornik, L.J.	EG	MM	Mack., Sask., Man., & Ont.,	64; 74; 75; 42 A; 31 G
	Obj.: A regional study to correlate geology with magnetic patterns and anomalies by means of in situ magnetic susceptibility and ramanent magnetism measurements of oriented samples.					
670002	Operation Bylot	Jackson, G.D.	CG	PS	Frank.	Pts 27, 37, 38, 48
	Obj.: A reconnaissance geological survey of a previously unmapped area to describe and interpret the broad geological framework and outline areas of potential economic interest. (Scale 1:250,000.)					

670004	Study of the Hurwitz Group in the eastern part of the Rankin-Emadai belt	Bell, R.T.	CG	PS	Kee. 55 E, F, J, K, L: 65 I; pts 65 G,H
	Obj.: To define the sedimentary units and their stratigraphic relationship and interpret their provenance, dispersal patterns and depositional environment as well as their structure and relations to the basement rocks. The economic potential of the Hurwitz group and surrounding rocks should be evaluated as part of this study. Publication scale 1" -4 miles and 1" -1 mile as required.				
670005	Nature of the Thelen Front, N.W.T.	Fraser, J.A.	CG	PS	Mack. Pts 76 I,J, 75 O E½
	Obj.: To determine the nature of the Thelon Front by delineating the changes in lithology, metamorphic grade, and structure across the frontal zone, and to assess the occurrence and potential of mineral deposits in the area concerned. Scale of publication: 1 inch to 4 miles.				
670006	Sedimentology of the Yellowknife Group.	Henderon, J.B.	CG	PS	Mack. 85 J/8, 9, 16; 85 I/14; 85 P/3
	Obj.: To provide a palaeo-environmental interpretation of the Yellowknife Group sediments; to increase understanding of depositional mechanism of turbidite and associated sediments, and to study the transition from vulcanism to sedimentation in Archean times. To provide criteria for future regional studies of the Yellowknife Group.				
670014*	Operation Winisk	Norris, A.W.	ISPG	WP	Kee., Man., Ont., & Que. —
	Obj.: To study map and interpret the bedrock geology of the Hudson Bay Lowlands; to determine the age, thickness, distribution and structure of the rocks for evaluating the economic potential of the area.				

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
670031 *	Quaternary reconnaissance, southern Ellesmere Island	Blake, W. Jr.	QRG	R & SP	Frank.	38 G; 39 B,C; 49 A-D; 59 A,D
	<p>Obj.: Reconnaissance mapping of glacial deposits, landforms, and other Quaternary features in order to provide descriptive data on the Quaternary geology and geomorphology on the assigned area; to determine the chronology of events during glaciation and deglaciation; and to gather information on marginal fluctuations of glaciers, modern geologic processes, and changing environments.</p> <p>Remarks: Funded under 680065.</p>					
670068*	Operation Norman	Cook, D.G.	ISPG	PS	Mack.	86 D,E,I,L,M; 87 B,C; 96; 97 A-D,F; 106 A,B,G-H,I,J,O,P; 107 A,D,E
	<p>Obj.: To complete reconnaissance geological mapping, to conduct stratigraphic and structural studies, and to evaluate the economic potential of bedrock formations in the subject area; to embody the results of these studies in an integrated series of reports and maps, some under single authorship and others under multiple authorship according to the topic of the contribution.</p>					
670086	Schedule of Wells – N.W.T. and Y.T.	Yorath, C.J.	ISPG	MS	Frank, Kee, Mack, & Yk.	—
	<p>Obj.: Publication of Mesozoic formational tops for all wells drilled in N.W.T. and Y.T.</p>					
670557	Stratigraphy and ages of Precambrian sedimentary rocks and contained sills and dykes, east coast of Canadian Arctic Island and north and northwest Greenland	Christie, R.L.	ISPG	AI	Frank.	120; 340; 560; 27-29; 37-39; 47-49; 57-59
	<p>Obj.: Comparison of stratigraphy and age determinations on diabase-gabbro sill rocks and other intrusive rocks.</p>					

670569	Clay minerals in Proterozoic sediments	(Donaldson, J.A.)	CG	PS	Kee. & Mack.	—
Obj.: Comparison of Clay mineral content of sandstone and siltstone units of the Dubawnt Group, Goulburn Group, Athabasca Fm and Martin Fm. based on mineralogical analyses of specimens now on hand.						
670576	Canadian Triassic Ammonoidea and Bivalvia	Tozer, E.T.	ISPG	WP	Frank. B.C. & Alta.	—
Obj.: To describe and assess biochronological significance of Triassic Ammonoidea and Bivalvia in order to refine methods for dating Triassic rocks.						
680012*	Paleomagnetic study of Proterozoic red beds in the western Canadian Shield	McGlynn, J.C.	CG	PS	Kee., & Mack.	F; 86; 85; 65; 66 75 E
Obj.: To obtain paleomagnetic pole positions from various Proterozoic red bed sequences in the western Precambrian Shield for purposes of correlation.						
Remarks: Change in area and NTS by deletion of NTS 74. Funded under 650008.						
680015	Geological reconnaissance of eastern Devon Island, with additional stratigraphic studies on southeastern Ellesmere Island	Christie, R.L.	ISPG	AI	Frank.	38 F, G; 48 E-H; 39 B, C, F-H; 49 A, B, D
Obj.: (a) Reconnaissance geological data on Precambrian rocks of eastern Devon Island; (c) stratigraphy of lower Paleozoic formations of SE Ellesmere Island with data on distribution if practicable so that maps on a scale of 1 in. to 4 miles or other suitable scale may be published.						
680019*	Operation Stewart	Blusson, S.	CG	C&PM	Mack. & Yk.	105 N.O.; 106 B, C
Obj.: To outline and interpret the regional stratigraphy and structure in a previously unmappped part of the Selwyn basin, and to relate these features to hite search for mineral deposits analogous to the Keno Hill and Vangorda deposits on the west and south.						

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
680032	Quaternary reconnaissance, northwest District of Mackenzie	Fulton, R.J.	QRG	R&SP	Mack.	86 F,L,M; 96 L,P; 87 B,C; 97 A-D,F; 106 I,J,O,P; 107 A, D, E
Obj.: To map and explain Quaternary deposits and landforms in order to: (1) establish their stratigraphic sequence and age and to outline the Quaternary history of the area; and (2) provide areal geological information including data applicable to permafrost and engineering studies.						
680040	Proglacial geomorphology, Generator Lake, Baffin Island	Barnett, D.M.	QRG	R&SP	Frank.	Pts 27 C; 37 D
Obj.: To map and explain glacial, lacustrine, and related landforms and deposits associated with both present and former levels of Generator Lake and to measure pertinent aspects of modern glaciolacustrine processes in order to elucidate the geomorphology and chronology of the area as a model of the proglacial lacustrine environment.						
680044	Quaternary reconnaissance, northeastern	Hodgson, D.A.	QRG	R&SP	Frank.	37 G,H; 38 A-C; pt 48 D
Obj.: Reconnaissance study and mapping of glacial deposits, landforms, and other Quaternary features in order to: (1) provide areal description data on the Quaternary geology and geomorphology of the assigned area; and (2) determine the chronology of events involved in glaciation, deglaciation, marine submergence, recent changes, etc.						
680046	Geomorphology of delta lakes, Mackenzie Delta	Lewis, C.P.	QRG	EG&G	Mack.	Pts 107 B
Obj.: To determine mechanisms and stages of development involved in subdivision of delta lakes by reversing channel levees, by investigating geomorphic forms, sediments in place, transport of suspended sediment, permafrost distribution, etc.						
680047*	Geomorphic processes, Mackenzie Valley – Arctic coast	(Mackay, J.R., Prof.)	QRG	EG&G	Mack. & Yk.	Pts 85,95,96,106,97, 107, 117
Obj.: To describe, measure, and explain geomorphic features and processes related to permafrost, and to fluvial, lacustrine, coastal, eolian, and mass wasting activity in a permafrost environment.						
680057*	Sedimentological study of the Hornby Group	(Donaldson, J.A.)	CG	PS	Mack.	86 N <sup>1</sup> / <sub>2</sub> ; 96 N E <sup>1</sup> / <sub>4</sub>
Obj.: To interpret the depositional history of the sedimentary units in the Hornby Bay Group and to assess possible correlations with similar rocks elsewhere on the Precambrian Shield. Publication scale 1" = 4 miles.						

680064	Stratigraphy and paleontology of Upper Paleozoic rocks on parts of Ellesmere and Axel Heiberg Islands	Nassichuk, W.W.	ISPG	AI	Frank. 49 B,F,G,H; 340 A-D; 560 A
<p>Obj.: To study Upper Paleozoic rocks in the Sverdrup Basin and to examine facies relationships between basin marginal and basin axial regions. It will be necessary to compare Upper Paleozoic rocks sequences on Ellesmere and Axel Heiberg Islands with comparable sequence on Devon and Melville Islands. In addition a biostratigraphic framework for Carboniferous and Permian rocks through the study of ammonoids must be established. The economic potential of the area is to be evaluated.</p>					
680065*	Pumice on raised beaches, eastern Arctic Canada	Blake, W. Jr.	QRG	P&G	Frank., Kee., & Que., & NFLd. (Lab.) Pts 13-16, 24-27, 29, 35-39, 46-49, 57-59, 68, 69, 120,
<p>Obj.: To locate sites where pumice occurs on raised beaches in eastern Arctic Canada and determine elevation, age, and origin of the pumice in order to: (1) correlate raised marine levels throughout the region; (2) calculate regional tilt of raised marine features, using pumice level as a guide horizon; and (3) determine the form of the last ice sheet.</p>					
680068*	Mesozoic palynology and biostratigraphy, western and northern Canada	Hopkins, W.S. Jr.	ISPG	WP	Frank. Mack. Yk. B.C. & Alta. —
<p>Obj.: Establishment of sequences of biostratigraphic zones to allow correlation by spores and pollen of Mesozoic rocks of western and northern Canada.</p>					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
680085*	Structural and stratigraphic study of the Precambrian rocks of southwestern Keewatin, N.W.T.	Eade, K.E.	CG	PS	Kee.	65 B,C,G, W <sup>1</sup> / <sub>2</sub>
<p>Obj.: To study and interpret the regional geology and mineral occurrences of the area, including such specific problem as</p> <p>1) the relationships of the known Hurwitz group rocks to other metasedimentary units, 2) the extent and characteristics of the original basins of deposition, 3) the petrology and mineral potential of the post-kinematic fluorite bearing porphyritic rocks, as a contribution to the economic development of northern Canada. Scale 1 inch to 4 miles.</p>						
680092	Geology of Southampton Island	Heywood, W.W.	CG	PS	Kee.	45 M-P, J, pt I; 46 A-C, F; pts 46 D,E,G
<p>Obj.: To conduct a geological study at 1 inch to 4 miles or 1 inch to 8 miles scale, of Southampton Island and Coats Island, N.W.T., with particular attention to correlation of the Precambrian rocks with those in eastern Keewatin and Baffin Island; to the determination of the basic stratigraphy of the Paleozoic rocks; and to the economic potential of the region.</p>						
680093*	Devonian biostratigraphy, western and northern Canada	Pedder, A.E.H.	ISPG	WP	Frank. Mack., Yk., B.C. & Alta.	—
<p>Obj.: Establishment and refinement of Devonian faunal sequences to allow correlation of Devonian rocks of western and northern Canada.</p>						
680101*	Conodont biostratigraphy of Paeozoic rocks of the Arctic Islands	Uyeno, T.T.	ISPG	WP	Frank.	49; 58; 59; 68; 69; 78; 79; 88; 89; 560
<p>Obj.: To set up zonal standards for conodonts for the Arctic Islands to correlate conodont and palynomorph zones in measured sections, and to obtain fossil data of immediate use of those engaged in geological mapping of the Arctic Islands.</p>						

680113	Biostratigraphic study of Paleozoic palynomorphs of the Arctic Islands	McGregor, D.C.	CG	EP	Frank.	49;58;59;68;69;78;79; 88; 89; 56 O
	Obj.: (1) To set up zonal standards for palynomorph for the Arctic Islands. (2) To correlate palynomorph zones with conodont zones in measured sections. (3) To obtain fossil data of immediate use to those engaged in geological mapping of the Arctic Islands.					
680134	Regional distribution of gaseous hydrocarbons in the Arctic archipelago	McCrossan, R.G.	ISPG	Goff	Frank.	—
	Obj.: Have analyses of C <sub>1</sub> to C <sub>6</sub> range hydrocarbons made on shot hole and bore hole samples resulting from the Panarctic drilling program with a view to evaluating the Source rock potentials in the various basins of the Arctic.					
690005*	Structural geology of northern Yukon Territory and northwestern District of Mackenzie	Norris, D.K.	ISPG	SG	Mack. & Yk.	Pts 107, 117
	Obj.: Critical evaluation of the structural geometry of Richardson, Barn and British Mountains, intervening plateaux, and adjacent coastal plain for publication on scales of 1/50,000; 1/100,000; and 1/200,000 as deemed appropriate for documentation of the nature, origin and mechanics of the deformation and its bearings on the hydrocarbon and mineral potential of the region. Remarks: Funded under 610007.					
690020*	Mezozoic-Tertiary stratigraphy and sedimentation — Beaufort-Mackenzie area	Yorath, C.J.	ISPG	MS	Mack.	106 N; 107; 116 N; 117
	Obj.: To determine the developmental history of the Mackenzie Delta and adjacent sedimentary basins; and to contribute to the realization of the economic potential of the region.					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
690024*	A stratigraphic, sedimentological, and paleontological study of the Epworth Group, northcentral District of Mackenzie	(Hoffman, P.F.)	CG	PS	Mack.	Pts 86
Obj.: To determine the depositional environment, palaeogeographic and paleoecologic history of the Epworth basin in an attempt to achieve interbasinal correlation between the Epworth and Great Slave Groups and to determine Aphebian depositional history.						
Remarks: The objectives have been changed						
690025	Sedimentary geology of the Coppermine area	(Donaldson, J.A.)	CG	PS	Mack.	86 N,O
Obj.: To define in NTS 86 O & N the units within the Coppermine sedimentary rocks, to determine their provenance, dispersal patterns, depositional environments economic potential and correlation with similar rocks elsewhere in the Shield.						
690028	Operations Coppermine and Bathurst Inlet	Fraser, J.A.	CG	PS	Kee. & Mack.	Pts 66,67,76,77,86,87,96,97
Obj.: To provide reconnaissance geological information and assess the economic mineral potential of 120,000 square miles mainly unmapped terrane in the northwest Canadian Shield. Publication scale 8 miles to 1 inch.						
690036*	Regional geochemical census of plutonic rocks in the eastern Yukon	Garrett, R.G.	EGG	G	Mack. & Yk.	95;105;106;116
Obj.: (1) To ascertain whether differences in geochemistry of these plutons can be used to distinguish those that have related deposits of W, Mo, Sn, Au, and Cu and those that do not. (2) To contribute chemical data on these rocks which may be used in interpreting their geological occurrence and correlation.						
Remarks: Revised objectives. Preliminary results (1969) indicate that contributions to both objectives are promising.						

690039*	Transport and deposition of ore indicator elements for streams and sediments	Nigrini, A.	EGG	G	Mack. & N.B.	86 N/8,9; 21 O/9, 7 E $\frac{1}{2}$ ; P/12,13; 16 E $\frac{1}{2}$
	Obj.: By studying the mechanism of the transport and deposition of ore indicator elements in streams, stream sediments and organic material to provide concepts for the development of new geochemical exploration methods and the means for interpreting geochemical surveys.					
	Remarks: Areas has been enlarged.					
690040*	Seismic – Beaufort-Mackenzie	Hobson, G.D.	EG	SM	Mack.	106;107;117
	Obj.: To acquire seismic data in the Mackenzie Delta-Beaufort Sea area probably through participation surveys and to provide the 3rd dimension required by I.S.P.G. geologists to interpret sedimentation and structural history of the area.					
690044	Fossil mosses in the Arctic	(Kuc, M.)	QRG	P&G	Frank. & Mack.	—
	Obj.: 1. To provide information on age and environment of origin of Beaufort, interglacial, and postglacial deposits in the western Arctic, through identification of fossil mosses and other organic remains and study of fossil floras. 2. To develop and illustrate a method for biostratigraphic and paleoecologic analyses of postglacial Arctic peat profiles.					
690046*	Quaternary reconnaissance northwest District of Mackenzie, stage II	Hughes, O.L.	QRG	R&SP	Mack.	86 C,D,E; 96 A-H; 106 A,B,G,H
	Obj.: To map and explain Quaternary deposits and landforms in order: (1) to establish their stratigraphic sequence and age to outline the Quaternary history of the area; and (2) to provide areal geological information including data applicable to permafrost and engineering studies.					
690047*	Quaternary geology, Beaufort-Mackenzie	Rampton, V.	QRG	R&SP	Mack. & YK.	97 F; 107 B,C,D,E; 117 A,C,D
	Obj.: To map and explain Quaternary deposits and landforms in order to: (1) establish their sequence and age and outline the history of preglacial, interglacial, glacial, and postglacial events; and (2) provide areal and stratigraphic geological information including data applicable to permafrost and engineering studies and petroleum development.					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
690050*	Microdeposits as a probabilistic indicator or ore potential	Cameron, E.M.	EGG	G.	Ont., Que. & Mack.	—
<p>Obj.: To determine the frequency distribution of metallic elements in barren and host rocks of known ore potential for the purpose of:</p> <p>(a) Developing geochemical methods for forecasting the ore potential of a belt or rock unit. (b) Developing methods that may be applied to exploration for buried ore deposits by drilling on a probabilistic basis. (c) Developing methods of obtaining, interpreting and presenting geochemical and geological data such that they may be used for making statistical investment decisions.</p>						
690054*	Erosion in a permafrost environment	Heginbottom, J.A.	QRG	EG&G	Mack.	Pt 107 B
<p>Obj.: To document the nature, extent, and rate of erosion in permafrost areas disturbed by activities of man, and to determine the importance of surface material, geomorphology microclimate, snow cover, vegetation, depth of active layer, ground ice distribution and other factors on controlling erosion.</p>						
690061*	Operation Penny Highlands	Jackson, G.D.	CG	PS	Frank.	Pts 16, 26, 36, 27, 37
<p>Obj.: A reconnaissance geological survey of a previously unmapped area to describe and interpret the broad geological framework and outline areas of potential economic interest. (Scale 1:500,000).</p>						
690067*	Federal-Provincial Aeromagnetic Surveys — Yukon, N.W.T.	MacLaren, A.S.	EG	SP	Mack. & YK.	86 F-P; 76 L,M; 105 M; 106 C,D N , E,F; 116A N , B , N F-H
<p>Obj.: To produce 1 and 4 mile aeromagnetic maps for geological and mineral exploration.</p>						

Remarks: Funded under 690071.

690068*	Federal-Provincial Aeromagnetic Surveys – Keewatin and Mackenzie, N.W.T.  Obj.: To produce 1 and 4 mile aeromagnetic maps for geological and mineral exploration.	MacLaren, A.S.	EG	SP	Kee. & Mack. 56 A-P; N 55 M,N&O; 66 A-P; N 65 F,G; 65 J,K,L,M,N,O,P; 75 P
690070*	Federal-Provincial Aeromagnetic Surveys – Central Baffin Island  Obj.: To produce 1 and 4 mile aeromagnetic maps for geological and mineral exploration.	MacLaren, A.S.	EG	SP	Frank. 16 K-M; 26 I-P; 27 A-D; 36 P;37 A,B
690071*	Federal-Provincial Aeromagnetic Surveys – Northern Baffin Island  Obj.: To produce 1 and 4 mile aeromagnetic maps for geological and mineral exploration.	MacLaren, A.S.	EG	SP	Frank. 37 D,F; Pts 27 C,D; 37 C,E,G,H; 38 B
690072*	Federal-Provincial Aeromagnetic Surveys – Labrador and S. Baffin Island  Obj.: To produce 1 and 4 mile aeromagnetic maps for geological and mineral exploration.	MacLaren, A.S.	EG	SP	Frank. & 13, A-O; 14 B-F,L,M;16 Nfld. E;23 A,B,C-J; Pts 23 O, P;24 A,H,I,P;25 A, I-P;26 A-H;35 P;36 A-I

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
NP*	Geochemical reconnaissance of the Arctic Islands and northern mainland coast.	Hornbrook, E.H.W.	EGG	G	Kee. & Mack.	—
Obj.: To help to assess the mineral potential and encourage mineral exploration in the far north.						
Remarks: The possibility of mineral development in this region has been enhanced by the possibility of large bulk shipments by sea as demonstrated by the passage of the M.S. Manhattan. This project will consist of preliminary studies by G.S.C. staff, full implementation would require contracting the study to a commercial organization.						
NP*	Development of regional geochemical exploration methods for permafrost areas	Allan, R.J.	EGG	G	Mack.	86 N,O
Obj.: (1) To develop, test, and demonstrate the feasibility of geochemical methods suitable for reconnaissance prospecting in permafrost regions and thus to provide industry with geochemical methods for outlining areas having an anomalously high content of economic elements in those regions with permafrost. (2) To investigate the fundamental theories involved in application of geochemical prospecting methods in regions of permafrost.						
NP*	Reconnaissance examination of high grade metamorphic and granitoid rocks of southern Melville Peninsula	Reesor, J.E.	CG	Pet	Kee.	46 J,K,N,O
Obj.: To select areas for more detailed study and to develop a cooperative project with W.W. Heywood for 1971.						
NP*	Operation Northern Melville Peninsula	Heywood, W.W.	CG	PS	Frank.	Pts 47 A,B,C,D
Obj.: To map and study the bedrock geology of a previously unmapped terrane describing the general structural, historical and economic geology as a basis for future economic development of northern Canada.						

NP*	Geology of the Amer Lake Belt	Henderson J.B.	CG	PS	Kee.	66 H;Pt 66 G,56 E
	Obj.: To define stratigraphy and lithographic units, structure and metamorphism of the Amer Lake sedimentary – volcanic belt and to assess the mineral potential of the project area. To produce a map at scale of 4 miles to 1 inch of the Amer Lake area, and an analysis of the sedimentary basin.					
	Remarks: Project subject to review in favour of revision of Yellowknife (85J) and Hearne Lake (85J) map-areas					
NP*	Volcanic study in the Ennadai Belt, N.W.T.	Recruit (Vice Goodwin)	CG	PS	Kee.	65;55 E,F,J-L, Pts H, I
	Obj.: To determine the stratigraphic framework, volcanic history and structures within the volcanic belts and their relation to mineral deposition.					
NP*	Operation Prince of Wales	Christie, R.L.	ISPG	AI	Frank.	—
	Obj.: —					
NP*	Sedimentology and stratigraphy of classic forms in the Arctic Islands	Trettin, H.P.	ISPG	AI	Frank.	560; 340; 120; 29; 39; 49; 59; 69; 79; 89; 38; 48; 58; 68; 78; 88; 98; 47; 57; 67; 77; 87; 97
	Obj.: —					
NP	Structural stratigraphic subsurface investigations	Havard, Mrs. C.J.	ISPG	SG	Mack.	107; 117
	Obj.: —					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
NP	Mesozoic stratigraphy	Young, F.G.	ISPG	MS	Mack., Kee. & YK.	—
	Obj.: —					
NP*	Paleontological sampling of critical Paleozoic stratigraphic sections.	Norford, B.S.	ISPG	WP	Frank.	—
	Obj.: —					
NP*	Geology and geomorphology of the Baffin Shelf	To be assigned	QRG	R&SP	Frank.	—
	Obj.: To map and explain the Quaternary and older sea-bottom deposits and geomorphology of the Baffin Shelf in order to: (1) provide areal geological knowledge and (2) complement onshore investigations. In co-operation with and dependent on program of A.O.L.					
NP*	Quaternary reconnaissance, Central Baffin Island	Barnett, D.M.	QRG	R&SP	Frank.	Pts 16; 26; 27; 36; 37
	Obj.: Reconnaissance study and mapping of glacial deposits, landforms, and other Quaternary features in order to: (1) provide areal description data on the Quaternary geology and geomorphology of the assigned area; and (2) determine the chronology of events involved in glaciation, deglaciation, marine submergence, recent changes, etc.					

NP*	Quaternary geology, southern Beaufort Sea	To be assigned	QRG	R&SP	Frank.	117, 107 offshore area E of 141°
	Obj.: To map and explain the unconsolidated sea-bottom materials and geomorphology of Mackenzie Bay and nearshore parts of the Beaufort Sea in order to: (1) provide areal geological knowledge including background for other scientific studies in the Beaufort Sea; (2) complement onshore investigations in determining Quaternary stratigraphy and history; and (3) complement onshore investigations in defining the sedimentation pattern of present and past deltas of the Mackenzie River.					
NP*	Quaternary reconnaissance, Devon Island	Blake, W. Jr.	QRG	R&SP	Frank.	Pts 38 F,G;48 E-H; 58 E,G,H;59 A-C;69 A,D
	Obj.: Reconnaissance mapping of glacial deposits, landforms, and other Quaternary features in order to provide descriptive data on the Quaternary geology and geomorphology on the assigned area; to determine the chronology of events during glaciation and deglaciation; and to gather information on marginal fluctuations of glaciers, modern geologic processes, and changing environments.					
	Remarks: Funded under 680065.					
NP*	Quaternary geophysics – Mackenzie Delta region	To be decided	QRG	EG&G	Mack.	Pt 107 B
	Obj.: To apply shallow seismic and other geophysical techniques in the determination of configuration of frozen ground and the elucidation of Quaternary stratigraphy in permafrost areas. Project jointly with E.G. Division.					
NP*	Mineral indicator tracing, southern Keewatin	To be assigned	QRG	EG&G	Kee.	55 E,F,K,L
	Obj.: Through petrographical, mineralogical and geochemical analysis of samples from eskers and till, to determine the pattern of rock and mineral components in glacial sediments relative to their bedrock occurrence and to occurrence of mineral deposits.					



**APPENDIX C**

**GEOLOGICAL SURVEY OF CANADA  
PRELIMINARY SCIENTIFIC PROGRAM  
YUKON TERRITORY  
1970-71**

## YUKON

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
80009	Operation Pelly	Roddick, J.A.	CG	C&PM	YK.	105 K,J,I,F,G
Obj.: To describe the main rock units, their ages, stratigraphic and structural relationships, and geologic history; to relate these factors to the regional geology of Yukon Territory; and to show where possible the relation of known mineral deposits to this framework.						
00008	Project Klondike, Quaternary geology and geomorphology phase	Hughes, O.L.	QRG	R&SP	YK.	Pts 115 I,J,K E <sup>1</sup> / <sub>2</sub> , N E , O,P
Obj.: To determine the stratigraphy, geomorphology and distribution of Tertiary to Recent deposits of the Klondike district and surrounding area in order to provide background information for heavy mineral phase (Gleason, McLeod) and to elucidate Quaternary and late Tertiary history of the region.						
10007*	Operation Porcupine	Norris, D.K.	ISPG	SG	Mack. & YK.	106; 107; 116; 117
Obj.: Reconnaissance mapping of potential oil and gas region.						
10019	Ordovician and Silurian biostratigraphy of British Columbia, Alberta, Yukon, Mackenzie, and Franklin	Norford, B.S.	ISGP	WP	Frank., Mack., YK., B.C. & Alta.	—
Obj.: Establishment of sequence of biochronological zones for Ordovician and Silurian time.						

630011	Operation Nahanni	Gabrielse, H.	CG	C&PM	Mack. & YK.	95 E.L.M
Obj.: Geological study and mapping of the Flat River (95E), Glacier Lake (95L) and Wrigley Lake (95M) map-areas to provide information on the age, structure, sequence, relationships, thickness, and origin of bedrock formations and on the size, grade, mode of occurrence, origin and potential of mineral deposits.						
630341	Paleontology and stratigraphy of the Carboniferous and Permian of northern Yukon	Bamber, E.W.	ISPG	WP	Mack. & YK.	116 B,C E <sup>1</sup> / <sub>2</sub> , G-I, K E <sup>1</sup> / <sub>2</sub> , N E <sup>1</sup> / <sub>2</sub> , O,P; 117 A-D
Obj.: Stratigraphic and paleontological information obtained on Operation Porcupine will be assembled to present a general picture of the Carboniferous and Permian rocks of the Yukon north of the 65th parallel.						
630415	Lower Cretaceous (Albian) stratigraphy of Peel and Snake Rivers, Yukon Territory	Channey, T.P.	ISPG	WP	Mack. & YK.	106; 116; 107; 117
Obj.: To aid in new stratigraphic interpretations obtained on Operation Porcupine.						
640013	Mt. Haldane and Dublin Gulch map-areas	Poole, W.H.	CG	C&PM	YK.	105 M/13; 106 D/4
Obj.: An investigation of the bedrock geology of map-area 105 M/13 and as much of 106 D/4 as is feasible, as an aid to economic development in Keno Hill mining camp.						
640016	Operation Keno, surficial geology phase	Hughes, O.L.	QRG	R&SP	YK.	105 M N <sup>1</sup> / <sub>2</sub> ; 106 D/1-4
Obj.: To study and map the surficial deposits and related physical features; to differentiate deposits of successive glacial advances, to determine the Quaternary history of the area as displayed in the deposits.						

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
650010	Operation Selwyn	Gabrielse, H.	CG	C&PM	Mack., YK. & B.C.	95 D; 105 A, H, I, P; 104 O
Obj.: To establish the stratigraphic sequence and determine the nature of abrupt facies changes in lower Paleozoic rocks of western Mackenzie and Selwyn Mountains, and to study the relationship and distribution of formations that are host to large base metal deposits, as a contribution to the economic development of the north.						
650012	Metallogenic study of the beryllium-tin province of the Cassiar batholith	Mulligan, R.	EGG	MD	Yk. & B.C.	105 A, B; 104 O, P
Obj.: To investigate occurrences of economic minerals, their relationship to the geological environment, and the distribution of specific elements in igneous and other rocks and in stream sediments of the area.						
650013	Quaternary geology, Aishihik Lake and southwestern Yukon	Hughes, O.L.	QRG	R&SP	YK.	115 H
Obj.: To map and explain the Quaternary geology and geomorphology of Aishihik Lake area with particular reference to limits of glaciation (including the outermost glacial limit) and other aspects of Quaternary history in order to: (1) improve knowledge of the glacial history of southwestern Yukon; and (2) provide areal geological information.						
650131	Quaternary geology, Snag-Kluane Lake	Rampton, V.	QRG	R&SP	YK.	115 F E <sup>1</sup> / <sub>2</sub> , G, J, K, E <sup>1</sup> / <sub>2</sub>
Obj.: To map, describe and explain the glacial deposits extending from the snout of Klutlan glacier to the limits of glaciation north of Snag, with particular reference to the development of geomorphic and other criteria for differentiating the deposits and landforms relating to the several glaciations known to have affected the area in order to: (1) differentiate the deposits of the area according to the respective glacial stages and substages during which they were deposited; and (2) develop a chronologic framework within glacial deposits of adjacent parts of Yukon can be classified on a reconnaissance basis.						

660002	Atlin Horst project	Monger, J.W.H.	CG	C&PM	YK. & B.C.	Pts 104 J,K,M,N; C,D	Obj.: 1. To establish a reference section for Late Palaeozoic rocks in northern British Columbia. 2. To determine relationships between Permian, pre-Permian and post-Permian rocks in this area. 3. To determine the structural style of these rocks in the 'Atlin Horst'.
660020	Structural and palaeomagnetic fabric of the Mackenzie Arc	Norris, D.K.	ISPG	SG	Mack. & YK.	106; 107; 116; 117	
670009	Stratigraphic-structural study of the Anvik-Vangorda district	Tempelman-Kluit,	D.J.	CG	C&PM	105 K/5, 6; pts 105 K/2, 3, 7, 10-12	Obj.: Analyze the tectonic history of the northern Cordillera, to establish the sequence of superposed deformations and to assess the control of the initial geometry of the sedimentary basins of the depositional and tectonic history of that area.
670011	Study of a Tertiary Cauldera Complex, Bennett Lake, B.C. and Yukon	(Lambert, M.S.)	CG	C&PM	YK. & B.C.	Pts 105 D/5; 104 M/14	Obj.: To provide geological data that will be of optimum assistance to mineral exploration and permit an assessment of the mineral potential of the area.
670086	Schedule of Wells — N.W.T. and Y.T.	Yorath, C.J.	ISPG	MS	Frank. Kee. Mack. & YK.	—	Obj.: To describe and interpret the petrography and structure of a circular volcanic complex and contribute to the understanding of volcanic processes in the Cordilleran region.
670086	Schedule of Wells — N.W.T. and Y.T.	Yorath, C.J.	ISPG	MS	Frank. Kee. Mack. & YK.	—	Obj.: Publication of Mesozoic formational tops for all wells drilled in N.W.T. and Y.T.

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
670090	Subsurface Upper Paleozoic stratigraphy, Northwest Territories and Yukon Territory	Martin, H.L.	ISPG	PS	YK.	95 A-G, K, L, M; 105; 106 B-F, K-M; 115; 116
Obj.: (1) To provide geological information, particularly formational tops, as required by the Department of Indian Affairs and Northern Development for publication in their annual Schedule of Wells; and (2) to identify stratigraphically significant subdivisions of the interval; to determine their areal extent, thickness, lithologic character, structural configuration, and relationships to adjacent strata; to deduce the sequence of geologic events which produced them to correlate the surface to subsurface stratigraphy; and to explain the relationships between porosity development and facies.						
680019*	Operation Stewart	Blusson, S.	CG	C&PM	Mack. & YK.	105 N,Q; 106 B,C
Obj.: To outline and interpret the regional stratigraphy and structure in a previously unmapped part of the Selwyn basin, and to relate these features to the search for mineral deposits analogous to the Keno Hill and Vangorda deposits on the west and south.						
680031	Quaternary stratigraphy of Old Crow Basin and Porcupine River Valley	Hughes, O.L.	QRG	R&SP	YK.	Pts 116 O; 117 A, B E 1/2
Obj.: Through investigation of Quaternary deposits and associated organic remains, to gain knowledge of the Quaternary stratigraphy and history of the region and to provide a geological framework for current vertebrate paleontology and archeology studies by National Museum scientists.						
Remarks: NTS Nos. revised.						
80047*	Geomorphic processes, Mackenzie Valley — Arctic coast	(Mackay, J.R., Prof.)	QRG	EG&G	Mack. & YK.	Pts 85, 95, 96, 106, 97, 107, 117
Obj.: To describe, measure, and explain geomorphic features and processes related to perma-frost, and to fluvial, lacustrine, coastal, eolian, and mass wasting activity in a permafrost environment.						

680063*	Permian biostratigraphy, northern British Columbia and northern Yukon	Nassichuk, W.W.	ISPG	AI	YK. & B.C.	116 H; 104 H
Obj.: To study stratigraphy and paleontology of Permian rocks in selected areas of northern British Columbia and northern Yukon and to establish relationships of these rocks with Permian strata in the Sverdrup Basin and in the Permian Basin of West Texas.						
680068*	Mesozoic palynology and biostratigraphy, western and northern Canada	Hopkins, W.S. Jr.	ISPG	WP	Frank, Mack, YK., B.C. & Alta.	—
Obj.: Establishment of sequences of biostratigraphic zones to allow correlation by spores and pollen of Mesozoic rocks of western and northern Canada.						
680093*	Devonian biostratigraphy, western and northern Canada	Pedder, A.E.H.	ISPG	WP	Frank, Mack, Yk., B.C. & Alta.	—
Obj.: Establishment and refinement of Devonian faunal sequences to allow correlation of Devonian rocks of western and northern Canada.						
680118	Compilation of 1:1,000,000 map, MacMillan River area, Yukon	Gabrielse, H.	CG	CG	YK.	105;115
Obj.: To prepare a geological compilation of the geology of the MacMillan River area, Yukon, as part of the National Atlas Series.						

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
6900025*	structural geology of northern Yukon Territory and north-western District of Mackenzie	Norris, D.K.	ISPG	SG	Mack. & YK.	Pts 107; 117
<p>Obj.: Critical evaluation of the structural geometry of Richardson, Barn and British Mountains, intervening plateaux, and adjacent coastal plain for publication on scales of 1/50,000; 1/100,000; and 1/200,000 as deemed appropriate for documentation of the nature, origin and mechanics of the deformation and its bearings on the hydrocarbon and mineral potential of the region.</p> <p>Remarks: Funded under 610007.</p>						
6900020*	Mesozoic-Tertiary stratigraphy and sedimentation – Beaufort-Mackenzie area	Yorath, C.J.	ISPG	MS	Mack. & YK.	106 N; 107; 116 N; 117
<p>Obj.: To determine the developmental history of the Mackenzie Delta and adjacent sedimentary basins, and to contribute to the realization of the economic potential of the region.</p>						
6900026*	Petrographic correlation of coal seams at Carmacks, Yukon	Hacquebard, P.A.	CG	CR	YK.	115 I/1
<p>Obj.: To determine extent of mineable coals in Carmacks area by correlation of different coal occurrences.</p>						
6900036*	Regional geochemical census of plutonic rocks in the eastern Yukon	Garrett, R.G.	EGG	G	Mack. & YK.	95; 105; 106; 116
<p>Obj.: (1) To ascertain whether differences in geochemistry of these plutons can be used to distinguish those that have related deposits of W, Mo, Sn, Au, and Cu and those that do not. (2) To contribute chemical data on these rocks which may be used in interpreting their geological occurrence and correlation.</p> <p>Remarks: Revised objectives. Preliminary results (1969) indicate that contributions to both objectives are promising.</p>						

690042*	Paleomagnetic studies of radiometrically dated igneous rocks in the Cordillera	Symons, D.T.A.	EG	RM	YK. & B.C.	92; 93; 103
	Obj.: —					
690047*	Quaternary geology, Beaufort-Mackenzie	Rampton, V.	QRG	R&SP	Mack. & YK.	97 F; 107 B, C, D, E; 117 A, C, D
	Obj.: To map and explain Quaternary deposits and landforms in order to: (1) establish their sequence and age and outline the history of preglacial, interglacial, glacial, and postglacial events; and (2) provide areal and stratigraphic geological information including data applicable to permafrost and engineering studies and petroleum development.					
690048	Soils in glaciated and unglaciated terrain	Rutter, N.W.	QRG	R&SP	YK.	Pt 115 P
	Obj.: To characterize soils (pedology) in the central Yukon, with particular reference to the contrast between soils in glaciated and unglaciated regions; develop a technique for differentiating soils developed in situ from those developed on transported material.					
690067*	Federal-Provincial Aeromagnetic Surveys — Yukon N.W.T.	MacLaren, A.S.	EG	SP	Mack. & YK.	86 F-P; 76 L, M; 105 M; 106 C, D N <sup>1</sup> / <sub>2</sub> , E, F; 116 A N <sup>1</sup> / <sub>2</sub> , B N <sup>1</sup> / <sub>2</sub> , N <sup>1</sup> / <sub>2</sub> F-H
	Obj.: To produce 1 and 4 mile aeromagnetic maps for geological and mineral exploration.					
	Remarks: Funded under 690071.					
690083	Investigation of Lower Jurassic genus Weyla as a guide fossil in British Columbia	Tipper, H.W.	CG	C&PM	Yk. & B.C.	—
	Obj.: To establish the value and feasibility of using the genus Weyla as a guide fossil in the Lower Jurassic succession of British Columbia; to describe and to determine the stratigraphic range of the several species believed to be present.					

Project Number	Title	Project Leader	Div.	Sect.	Prov.	NTS
NP*	Geology and economic mineral deposits of Yukon Territory	Findlay, D.C.	CG	SP	Yk.	—
Obj.: To compile a comprehensive account of the geology and economic mineral occurrences of Yukon Territory and to attempt to isolate and describe characteristic metallogenic features of the various geologic-tectonic elements of the Territory that will be of aid in the search for new deposits by industry.						
NP*	Stratigraphic structure study of part of Pelly Mountains	Tempelman-Kluit, D.J.	CG	C&PM	Yk.	Pts 105 F/7-10, 15, 16
Obj.: To determine the stratigraphy and structure of part of the Pelly Mountains in order to compare the contained strata bound Pb-Ag deposits with those in the Anvil Vangorda area across the Tintina Trench as an aid to mineral exploration.						
Remarks: It is expected this will be a two year project to complete.						
NP	Mesozoic stratigraphy	(Young, F.G.)	ISPG	MS	Mack., Kee. & Yk.	—
Obj.: —						

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### INLAND WATERS BRANCH

#### Responsibilities

*Hydrologic Sciences Division.* To provide and disseminate data on quantity and quality in Canadian rivers, lakes, aquifers, snow and ice; to develop new concepts and acquire new knowledge pertaining to the behaviour and occurrence of water in the hydrological cycle; to provide advice to the Federal Government on technical aspects related to the management of interprovincial and international waters; to provide an economic basis for pollution control; to ensure appropriate use and conservation of Canada's freshwater resources both quantitatively and qualitatively; to foster increased knowledge in the domain of water.

#### Long-Term Plans

Through the Hydrologic Sciences Division, the Branch plans to continue routine observations on selected Arctic glaciers. The climatological study will be modified to emphasize the relationship between sea-ice and glacier distribution and environmental conditions over the adjacent land masses.

Projects will relate to determination of subglacial topography, characteristics of the rock-ice interface and problems related to test-drilling through glaciers. Increased attention will be given to the study of floating glacier tongues and iceberg production from calving glaciers.

#### Review of 1969 Operations

The Hydrologic Sciences Division continued glaciological studies on Per-Ardua Glacier, Ellesmere Island, and on the Barnes Ice Cap and Decade Glacier, Baffin Island. A project on the Devon Island Ice Cap was contracted out to the Arctic Institute of North America. Plates for terrestrial photogrammetry were obtained from the White Glacier and Axel Heiberg Island to study mass balance.

In Ottawa work continued on:

- 1) the Glacier Inventory of Canada which will tabulate all Canadian glaciers and provide data on their size, altitude, orientation, volume, etc. The Baffin Island glaciers were indexed and partly tabulated;
- 2) further studies of the moisture flux pattern over the Eastern Arctic.

#### Plans for 1970

Glaciological studies will be continued on Per-Ardua and Decade glaciers and on the Barnes Ice Cap by field investigations in May-August. Work on Barnes Ice Cap will include a surface flow study and examination of marginal processes. Radio-echo sounding of the Meighen and Barnes ice caps will be carried out. Office studies and a field reconnaissance into the processes of iceberg production will be started.

A number of small projects related to surface water hydrology will be undertaken in the Mackenzie River and Delta area.

The Glacier Inventory and climatology studies will both continue as office projects.

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### INLAND WATERS BRANCH

#### Responsibilities

*The Water Survey of Canada* is primarily responsible for the collection, computation and publication of surface water data, including sediment data for the major portion of Canada and works in close co-operation with the provincial governments and other departments of the Federal Government. In addition to the operation of a network of gauging stations for the above purpose, the Water Survey co-operates with other Divisions of the Inland Waters Branch in the collection of water samples for water quality analysis and the operation of observation wells for groundwater studies. It also operates, constructs and maintains water level recording stations to provide information on tides and water levels for the Marine Sciences Branch. To support its operational activities the Water Survey of Canada carries out studies in hydrology and hydraulics, in instrument development and procedural methodology; operates a calibration facility for the rating of instrumentation used in its work; and operates laboratories for the analysis of sediment samples.

#### Long-Term Plan

Close co-operation and consultation with the Department of Indian Affairs and Northern Development and systematic in-depth engineering studies of the changes required in the hydrometric network will set the pattern for planning of future water resources survey activities in the Territories. The Water Survey, through co-operative arrangements with the Marine Sciences Branch and other divisions of Inland Waters Branch will continue to make observations of water levels for tidal and navigational purposes, of water quality, and of groundwater levels. A change in the status of the existing sub-offices at Fort Smith, N.W.T. and Whitehorse, Y.T. to district offices is proposed in order to place operational decision-making closer to the site of operations.

#### Review of 1969 Operations

The Water Survey of Canada operated its network of some 90 hydrometric gauging stations in the Yukon and Northwest Territories through offices at Whitehorse, Y.T. Fort Smith and Baker Lake, N.W.T., all sub-offices of the three western district offices. Water quality samples were collected at some 40 locations and tides and water level records at six. Preliminary assessment programs of sediment sampling of selected rivers was also started.

The first six gauging stations built under a cost-sharing arrangement between Energy, Mines and Resources and Indian Affairs and Northern Development were established in 1969.

#### Plans for 1970

The major undertaking for 1970 will be the completion of an intensive study being conducted by engineering consultants to define the degree to which the hydrometric network is serving present demands and changes needed to meet present and anticipated requirements in the Territories. Possibly five new gauging stations will be established and a rudimentary sediment survey program begun at three sites.

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### INLAND WATERS BRANCH

#### Responsibilities

*Water Quality Division.* Designs and operates water quality networks, monitoring and surveillance programs and pollution surveys on surface waters in Northern Canada for federal, territorial, municipal, industrial, mining and other uses and for the advancement of approved government policies and objectives in water resources research and management.

#### Long-Term Plans

In cooperation with federal and other government agencies, plans are being made to extend water quality networks and pollution survey programs to cover all major surface waters and pollution problem areas in Northern Canada in accordance with industrial and mining development and population growth.

#### Review of 1969 Operations

The water quality network was expanded from 21 to 36 in the Northwest Territories to form a 52-station network in Northern Canada. These stations are established on key rivers and streams in both the Yukon and Northwest Territories and coincide, for the most part, with hydrometric stations. Sampling ranged from monthly at about 12 stations to thrice per year at all other stations. Samples were analyzed for physical and chemical parameters including colour, turbidity, pH, conductivity, hardness, alkalinity, major ions, heavy metals and organics.

During the year, in cooperation with the Department of Indian Affairs and Northern Development, water quality monitoring programs were established on streams in and around eight mining developments in Northern Canada to study the effect of mining operations on surface waters in these areas.

#### Plans for 1970

Plans are underway to expand water quality networks to about 75 sampling stations on principal rivers and streams in Northern Canada to coincide with hydrometric stations. Mine wastewater monitoring will be extended as mining development expands.

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### MARINE SCIENCES BRANCH

#### Responsibilities

To carry out hydrographic and oceanographic surveys and studies in Arctic waters. To produce and distribute charts, sailing directions, tide tables and reports based on survey activities and information from all sources. To carry out geological, geophysical, physical and chemical studies of the Arctic marine environments to determine the circulation, wave regimes, tidal characteristics, properties and distribution of ice; to develop mathematical simulation models on the behaviour and movements of ice and pollutants in the Arctic Archipelago.

#### Long-Term Plans

To complete standard hydrographic surveys of the arctic coasts as soon as possible and to continue the publication and maintenance of up-to-date charts of the region. To carry out reconnaissance surveys where requirements exist for charting ahead of the regular surveys. To maintain reliable sailing directions as published in the Pilot of Arctic Canada. To publish tide tables to meet the need of northern navigation and to carry out research to enhance our knowledge of tides in northern waters.

To gather and interpret data on oceanographic and marine geophysical parameters with the object of understanding processes affecting the water column and the properties of the crust underlying the channels and the seas.

#### Review of 1969 Operations

The Canadian Hydrographic Service carried out the following field activities during the 1969 season:

*CSS Richardson*. The major project was the sounding of the area north of Kugmallit Bay. Some work was also carried out in the approaches to Sachs Harbour, Paulatuk and between Cape Parry and the Booth Islands.

*CCGS Camshell*. Two hydrographers carried out surveys in the Western Arctic as opportunity permitted. Surveys were made in the approaches to Expeditors Cove, just west of Coppermine, at M'Clintock Bay, Spence Bay, False Strait and Jesse Harbour where it was found that significant changes occur in the bar from year to year.

*CCGS John A. Macdonald*. Two hydrographers joined the ship at Resolute and collected track soundings throughout the MANHATTAN operation. While awaiting the ship a survey was started of Rae Point and Allen Bay.

*Polar Continental Shelf Project*. An extensive area was sounded through the ice over the outer continental shelf of the Beaufort Sea and the Canada Basin. During the summer a hovercraft was used to survey the approaches to Herschel Island.

*Charting Activities 1969*. Chart 7832, Eglinton Island to Cape Kellet, was published in preliminary print form. This is the first of the new series of reconstructed charts

of the Arctic showing soundings in metres. Chart 7833, Prince of Wales Strait, was published in advance print form. A new edition was published of chart 7000, Arctic Islands. This incorporates all of the soundings now available. A comparison with the 1959 first edition clearly shows how much our knowledge of hydrography in the Arctic has increased in the last decade.

The Division of Oceanography installed and operated seven permanent tide gauging stations during the year.

*Frozen Sea Research Group.* Two field operations were conducted during the year from our base on Greely Fiord (80° 36'N, 79° 35'W). For a period of seven weeks commencing March 1, 1969, a variety of measurements and tests were carried out, including:

- a) measurement of temperature profiles across the ice/water interface,
- b) petrographic studies on the sea-ice fabric;
- c) time series of temperature structures in the water down to a depth of 50 metres;
- d) dye tracer experiments on currents immediately below the ice using a periscope;
- e) *in situ* TDS measurements within ten miles of the base. These were the initial trials of new equipment developed for this purpose, including our A.R.U. tracked vehicle trains; and
- f) a whole variety of secondary investigations concerned with running the base as this was the first season of operations.

A second season of eight weeks duration commenced August 1, when experimental investigations were combined with the second stage of base erection. Time series measurements were made of the surface water structure from August 21 to September 21, the period during which the initial freeze-up occurs. The apparatus used centered around a thermistor chain attached to a submerged buoy, data from which was returned to the shore through one thousand feet of armoured cable. A third building, for storage purposes, was added to the base complex and the air strip was flattened off. The installation is now more or less complete.

Experiments on the freezing of fresh and salt water solutions have been carried out in our cold rooms at Victoria. These involved measurement of temperature profiles across a growing ice/water interface to a relative accuracy of  $\pm .001^{\circ}\text{C}$ . The experiments are continuing and are directed towards an expansion in understanding the mechanism of solid/liquid phase change.

Attempts to interpret field measurements made on water structure in terms of penetrative convection models have occupied considerable attention. Numerical models indicate that below growing sea-ice downward moving convective plumes have horizontal dimensions of the order of 50 centimeters.

## Marine Geological Projects in the Arctic – 1969

*Atlantic Region Participation.* These operations took place under the auspices of the Polar Continental Shelf Project, from its field base camp at Tuktoyaktuk, N.W.T. It consisted of sampling the sea bottom from the ice platform in an area of 100 miles radius from Tuktoyaktuk. During the six-week period of the operation, 60 samples were obtained together with environmental data. The study centered around the distribution of the benthic foraminifera and its relationship to ancient ocean conditions in the Arctic. Two summer students, Javed Iqbal, the party chief, and John Knight, his field assistant, were hired for this work.

## Plans for 1970

In view of the intense interest by the oil industry in the Beaufort Sea, a large proportion of the resources of the Canadian Hydrographic Service will be allocated to this area. While the final program will be flexible, to enable the best use to be made of the opportunities offered by ice and weather, initial plans call for three parties to operate as follows:

CSS *Baffin* will examine the area where two shoals were reported by CCGS *John A. Macdonald*. Then, if ice conditions are good, it will proceed to a survey of Prince of Wales Strait. CSS *Parizeau* will concentrate upon the Mackenzie Bay. The hydrographers assigned to the Polar Continental Shelf Project will sound a large area of the Canada Basin through the ice, then using a hovercraft, survey Franklin Bay, the potential site of a deep water tanker terminal. In addition, CSS *Hudson* will be carrying out a geophysical and geological survey of the Herschel Canyon.

One hydrographer will be conducting reconnaissance and exploratory surveys throughout the Athabaska and MacKenzie Waterways.

In the eastern Arctic it is hoped to use a Coast Guard icebreaker to commence a survey of Viscount Melville Sound. A smaller hydrographic team will carry out several small surveys in Hudson Bay and Strait and Foxe Basin.

## Proposed Charting 1970

It is planned that advance prints of nine metric charts of the Beaufort Sea will be available for the 1970 shipping season. The first nine new strip charts of the Mackenzie River will also be published.

## Division of Oceanography

The Division of Oceanography will install two permanent tide gauges as well as two wave-gauging stations at Herschel Island and Franklin Bay.

The CSS *Richardson* will be employed on a study of long shore circulation problems in the Amundsen Gulf between Herschel Island and Cape Bathurst. Geological and geophysical programs will be run in conjunction with the physical oceanographic studies. The oceanographic and meteorological observations will be used in a mathematical simulation model of the circulation of the Amundsen Gulf.

## Frozen Sea Research Group

A field party of five men will leave on February 27, 1970, for six weeks at our Greely Fiord base where they will carry out work following on directly from that completed in 1969. In addition, an oceanographic survey will be carried out for at least 100 km west of the base.

A summer field operation will extend through August and September and be concerned with recording the rapidly varying temperature and salinity of the surface waters during freeze up. This is a refinement of last year's work. Laboratory studies of the phase change process will continue. Our commitment to the design and development of instruments and support equipment to enable meaningful measurements in an Arctic winter environment remains unchanged at approximately 60 per cent of our total effort.

Some cooperative studies are being undertaken in conjunction with oil interests based at Calgary, Alberta. These will probably include discussions on ice pressure on structures and on environmental engineering.

## Marine Geological Projects in the Arctic – Atlantic Region Participation

A program similar to that of 1969 will take place off the west coast of Banks Island over the Polar Shelf. Again, two students will be hired and the work will be carried out under the auspices of the Polar Continental Shelf Project.

**Cruise of CSS Hudson 1970.** This cruise under AOL will begin at Victoria, B.C. on August 8 and terminate at Halifax, October 13. Essentially it comprises ship-borne operations from CSS *Hudson* with the assistance of the crew and 26 scientists and technicians. All but four are full time continuing employees of the department.

The work will commence in the Northwest Pacific where three deep coring stations and vertical plankton hauls are proposed. This will be continued in the Beaufort Sea together with the following, with station work on one shift and underway work on another:

- 1) *Station work:* biological sampling, oceanographic sampling, current metre work, geological sampling of seabed with grab samplers and corers, one or two drilling and dredging stations and bottom photography.
- 2) *Underway work:* continuous seismic reflection profiling (both deep, i.e., several thousands of feet of strata, and shallow, about 1500 feet of strata), sea magnetics, surface gravity bathymetry and side-scan sonar.

Program will extend to about September 20-24 and then continue on through the Northwest Passage to Resolute in order to arrive there by October 1. Some station work will be carried out en route. Other vessels in the area are expected to offer assistance. CSS *Baffin* may be carrying underway gravity and magnetometer surveys as well as providing opportunities for geological sampling. CSS *Parizeau* may also provide some geophysical assistance as well as providing for geological sampling. CSS *Richardson* may be used for shallow seismic profiling and for geological bottom sampling. In the cases of these support vessels not more than the following additional

staff is anticipated for the respective vessels, that is: five for *Baffin*, three for *Parizeau*, and three for *Richardson*. *Parizeau* and *Richardson* will assist for approximately eight weeks if ice permits. *Baffin* will arrive three weeks ahead of *Hudson* but both vessels will leave in company with DOT icebreaker support around September 24 for Resolute.

### Hydrographic Projects in the Arctic – Atlantic Region Participation

*Western Arctic, Beaufort Sea and Prince of Wales Strait – CSS Baffin.* This cruise under AOL is scheduled to commence at Halifax, N.S. on June 1, 1970. CSS *Baffin* will then proceed via the Panama Canal to Victoria, B.C., arriving there on June 25. The ship will remain in Victoria until July 10 departing on that date for the working areas in the Western Arctic, to arrive there about July 20. It is proposed to remain in the working area until September 20 at which time the ship will join CSS *Hudson* on the journey through the Northwest Passage, for a short survey in Baffin and the southward trek to Halifax, arriving in Halifax on October 15.

Essentially, the program is to carry out standard hydrographic charting operations in accordance with the following priorities, utilizing *Baffin*, five survey launches and one DOT helicopter.

Priority A. Examination of the two shoal areas found by CCGS *John A Macdonald* on the historic *Manhattan* cruise of 1969. The shoals are approximately 65 miles north of Tuktoyaktuk. If these prove to be pinnacle shoals they will affect survey specifications for this area as well as being of considerable geologic interest.

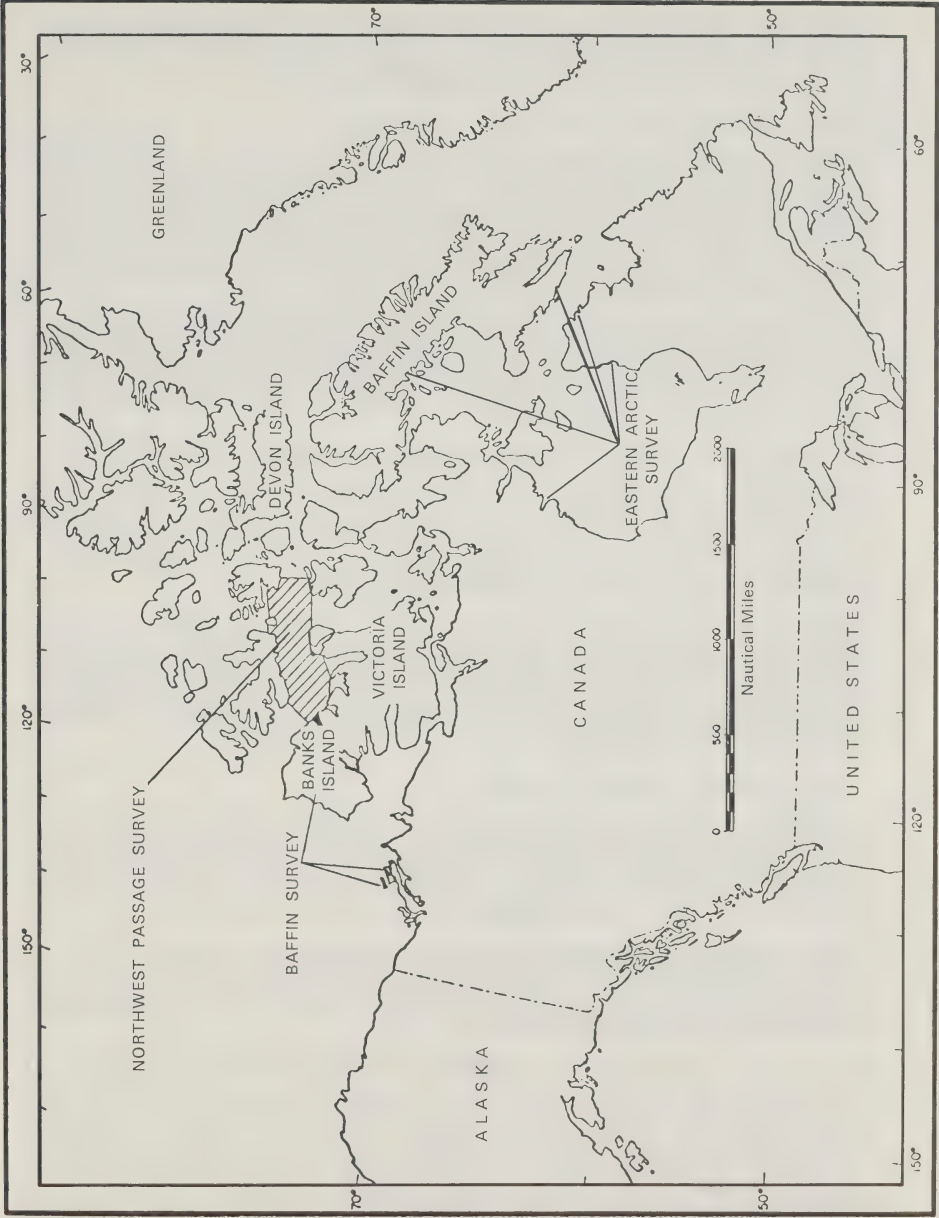
Priority B. Prince of Wales Strait. Standard charting of Prince of Wales Strait with the area around Princess Royal I. having the highest priority. This survey will only be carried out if ice conditions are good.

Priority C. Area East of Atkinson Point Coastal charting of this area with emphasis being placed on surveys out to the twenty fathom contour; however, if ice conditions permit soundings will be carried out to the fifty fathom contour. The oil find at Atkinson Point has focused interest in this area. As the bathymetry along this coast is comparatively unknown, the survey would also assist existing and future navigation.

Priority D. West of Herschel Island. In the Beaufort Sea the *Baffin* is to cross meridian 141 W as far north as possible and run a line of track soundings, controlled by Decca Lambda, to the area covered by priority "A".

In addition to the ship's officers and crew, this survey will be supported by seven hydrographers, one geophysicist, one geophysics technician, one geologist, two electronic technicians, one helicopter pilot, one helicopter engineer and two casual employees.

CSS *Baffin* will be equipped with a towed magnetometer, shipborne gravimeter and Van Veen grab samplers. The geophysics personnel will make continuous gravity and magnetic measurements and geological personnel will collect bottom samples throughout the survey area on an opportunity basis. It is also proposed to collect geophysical measurements in conjunction with *Hudson* on the homeward track with the greatest emphasis being on a short geophysical survey in Baffin Bay.



During the 1970 survey season, CSS *Parizeau* (from Pacific Region) and Polar Continental Shelf Project personnel will be engaged in similar charting programs in the Beaufort Sea at Mackenzie Bay and Franklin Bay.

#### **Northwest Passage Survey – CCGS Louis St. Laurent**

A party of five hydrographers, three electronic technicians and three casual employees from AOL will be joining the CCGS *Louis St. Laurent* at Resolute, N.W.T. in late July to carry out charting operations in Viscount Melville Sound between longitude 99° W and 111° W. The survey will utilize the CCGS *Louis St. Laurent*, two survey launches and one helicopter. Survey lines will be controlled by Decca 12f in the two range mode.

Negotiations are being carried on to have a commercial geophysical exploration company, under contract to Marine Sciences Branch, carry out continuous seismic profiling whenever conditions permit. These profiles will be obtained in conjunction with the hydrographic charting program.

The survey is tentatively scheduled to conclude near the end of September.

#### **Eastern Arctic Surveys (D.O.T.)**

It is anticipated that two hydrographers from AOL will join a DOT icebreaker assigned to the Eastern Arctic Patrol in early July and remain there until the completion of the shipping season in late October.

Essentially, this task will be to obtain track soundings as the vessel traverses the Eastern Arctic waterways and obtain reconnaissance soundings in uncharted areas on an opportunity basis. Areas of particular interest are as follows: Douglas Harbour and McKellar Bay in Hudson Strait; Povingnituk and Chesterfield Inlet in Hudson Bay; and Ege Bay in Foxe Basin.

#### **Marine Geophysics Projects in the Arctic**

*Western Arctic.* Gravity and magnetics surveying whenever possible in conjunction with the hydrographic survey of the Beaufort Sea and Prince of Wales Strait. Marine geophysics participation will involve one technician for the duration of the survey and one geophysicist for the initial phases.

Gravity and magnetic measurements on CSS *Hudson* as part of "HUDSON 70". The program will involve three geophysics personnel from August 8 to October 1. The work will involve underway measurements from Victoria, B.C., through the Western Arctic, North-West Passage to Resolute.

*Eastern Arctic.* Geophysics personnel will be carrying out underway geophysical measurements (gravity and magnetics) and seismic measurements in Baffin Bay from October 1 to October 10 and thence along return tract to Halifax, arriving in Halifax October 15. Both *Hudson* and *Baffin* will be used for this work. It is hoped to use either the USCGS *Edisto* or a DOT icebreaker as seismic shooting ship in the Baffin Bay area to assist with the seismic refraction experiment. The work will complement that to be undertaken by Dalhousie University personnel on CSS *Dawson* from July 28 to September 18. Apart from assistance provided by U.S. Coast Guard personnel all participants will be employees of the Department or staff or graduate students at Dalhousie University.

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### MINERAL RESOURCES BRANCH

#### Responsibilities

The Mineral Resources Branch of the Department of Energy, Mines and Resources undertakes mineral economic research and mineral policy development on a regional, national and international basis, in the context of the national interest. Branch activities include mineral resources and economic development in northern Canada, specifically: the provision of advice on and participation in the policy-formulation, program-planning and project-evaluation processes of the Department, interdepartmental committees and other departments including the Department of Indian Affairs and Northern Development. The Branch also administers the Emergency Gold Mining Assistance Act and recommends on mineral matters under the Income Tax Act to the Department of National Revenue.

#### Long-Term Plans

To continue to advise on, participate in and undertake Federal Government programs and activities that are related, wholly or in part, to mineral resource utilization and northern economic development.

#### Review of 1969 Operations

The Mineral Resources Branch continued as adviser to the Department of Indian Affairs and Northern Development and as participant in interdepartmental activities concerned with northern economic development. Previous special studies concerned with regional economic mineral appraisals, mineral industry development opportunities and possible infrastructure investment requirements were re-assessed as changing circumstances developed.

Priority was given to the completion of the Yukon and Northwest Territories section of the National Mineral Inventory, a comprehensive data system which serves as a central repository of information on mineral occurrences in Canada. This project is continuing and is expected to be completed by mid-1970. Results are being made available to the Northern Economic Development Branch.

As a member of the Interdepartmental Advisory Committee on Northern Development, the Interdepartmental Committee on Northern Roads, the Interdepartmental Committee on Pacific Coast Transportation, the Branch was involved in various economic mineral potential appraisals related, for example, to implementation of the 10-year, \$100 million northern roads program.

Reports were also provided on mineral property evaluations and field investigations to northern mineral establishments by mineral economists. Program planning and research were continued on a major comprehensive interdepartmental study relative to economic development and transportation requirements in northern British Columbia and the Yukon. The Department's responsibility for national energy policies required particular attention to petroleum developments in the Arctic; this involved the Branch on departmental and interdepartmental task forces. At the request of the Task Force on Northern Oil Development, the Branch completed a

short literature study on the possible opportunities for storing emergency crude oil supplies underground in salt caverns.

The Branch administers the Emergency Gold Mining Assistance Act, a national program introduced in 1948 to provide financial assistance to marginal gold mines encountering rising production costs under a fixed international price and to allow a more orderly adjustment of dependent communities. Field inspections were made of placer-gold and lode-gold operations in the northern territories. Approximately \$700,000 was payable to six lode mines in the Northwest Territories and \$25,000 payable to 12 placer operators in the Yukon for 1969. The Branch also provides advice to the Department of National Revenue with respect to tax benefits (i.e., three-year tax exemption, depreciation and depletion) under the Income Tax Act. Field investigations are made for this purpose when necessary and recommendations were made with respect to 22 mining operations in Canada of which two were in the Territories. The Branch also continued a study of the proposed new Yukon Minerals Act.

Branch involvement in mineral economic research and mineral policy development at the regional, national and international level is such that mineral industry corporations and related institutions seek advice on economic, technical, and administrative matters concerned with operating in the North.

#### **Plans for 1970**

The Mineral Resources Branch will continue to undertake mineral economic studies and develop policy recommendations to facilitate northern economic development in the role of adviser to the Department of Indian Affairs and Northern Development, as a participant in related interdepartmental committees and task forces, as administrators of the Emergency Gold Mining Assistance Act and as adviser to other departments such as the Department of National Revenue.

Specific studies under way or initiated in 1970 concern: economic development and transportation requirements in northern British Columbia and the Yukon Territory; northern energy policy; policy problems and alternatives in declining mineral-based regions and development of an over-all northern development strategy.

In addition to regular field investigations and inspections, Branch officers participate in conferences concerned with mineral economics and northern development.

## DEPT OF ENERGY MINES AND RESOURCES

### MINES BRANCH

#### Responsibilities

Technical assistance for the development of mining and metallurgical industries in the North and for the development and utilization of petroleum and natural gas resources. Consulting, advising and investigating metals, metallic and non-metallic minerals, fuels, petroleum and natural gas as related to northern development.

#### Long-Term Plans

To continue technical assistance in developing mineral, petroleum and natural gas resources in co-operation with industry, the Department of Indian Affairs and Northern Development and other branches of government.

#### Review of 1969 Operations

##### Metallic Ores

An investigation was continued with the object of developing an improved treatment process for a gold-silver ore from near Carmacks, Yukon Territory. A large number of flotation, roasting and cyanidation tests were conducted as this was a very refractory ore.

An investigation to develop a flotation process for a silver-lead-zinc-copper ore from Prairie Creek, N.W.T., has reached the stage of recommending a process to the company's consulting engineers for their approval. The ore is very complex, showing wide differences in ore composition between zones.

##### Other Minerals

An investigation was carried out on the ore of Canada Tungsten Mining Corporation in the Northwest Territories, District of MacKenzie. Part of the scheelite production from this operation is derived from flotation and the system employed concentrates calcite with the scheelite. Although this may be removed by acid leaching, the problem is to exclude as much as possible from the leaching plant.

While some success was achieved in calcite removed by the Industrial Minerals Milling Section, it may be more profitable to devise a flotation system which would separate scheelite from calcite. This is currently under study by this Section.

The fibre from a sample of asbestos originating in the Yukon was examined.

At the request of the Department of Indian Affairs and Northern Development, Mr. F.E. Hanes of the Construction Materials Section visited the area where occurrences of blue and green lapis lazuli, gem-quality rock, are located in the Soper River Valley, nine to ten miles north of Lake Harbour, Baffin Island. With Dr. D.D. Hogarth of the University of Ottawa Geology Department and two other assistants, the property was surveyed by plane-table, pits were opened across the exposures and samples and colour transparency records were taken. Objets d'Art were fabricated

from lapis lazuli in the Mines Branch laboratories to show the great value of this rock.

Various rocks of carvable quality from widely dispersed areas in Baffin were submitted for an assessment of workability and nomenclature. River gravel from the Frobisher Bay area was assessed for its suitability for use in building construction.

### **Mineralogical Examinations**

A mineralogical investigation was made of samples of lead-silver ore from Prairie Creek, N.W.T., submitted for mill tests on behalf of Cadillac Explorations Ltd. The principal ore and gangue minerals were identified and the characteristics of importance to milling procedure were evaluated.

Mineralogical assistance was also provided to the RCMP in their investigation of a fraud case involving mineral samples and claims in the Yukon Territory.

### **Extraction Metallurgy**

Several research and development programs carried out in extraction metallurgy will be of benefit to the mining industry of the Northwest Territories and Yukon. These programs included the recovery of trace metals from plant effluent solutions by ion exchange or charcoal absorption for control of pollution and, in some cases, to recover economic amounts of metal values. Arsine formed in the cyanidation of arsenical gold ores can be a serious hazard and a program initiated in 1969 to investigate the causes and prevention of its formation will be of benefit to certain N.W.T. mines.

In the analytical field the application of instrumental analysis was further explored and, to assist the long established mining companies in remote areas to take advantage of newer instrumental techniques, the formation of an analyst's organization to facilitate mutual assistance and dissemination of information on these techniques was assisted by the Extraction Metallurgy Division of Mines Branch.

Divisional representatives visited the Con-Rycon mines and mill and Giant Yellowknife mine and mill at Yellowknife, N.W.T., to discuss metallurgical matters with the mining companies' staffs. As in previous years, the facilities of the Mines Branch were made available for the annual meeting of the Canadian Mineral Processors, at which technical and operating experience relating to gold and base metal milling in Canada was exchanged among metallurgical staffs of the mining companies and also with the Mines Branch.

### **Fuels Research**

This work, as in 1968, was essentially confined to the field of chemical analysis. A sample of mine air was analyzed for the Giant Yellowknife mine for toxic and explosive gases. Research activities on the bituminous sand from Melville Island were stopped during the year because of insufficient sample. In this research an attempt was made to establish a connection between the sulphur isotope ratio and the oxygen content of the fresh bituminous material. The research on the coking properties of Tantalus Butte coal was continued. A sample of this coal was examined by scanning electron microscopy in the secondary electron mode. The various

maceral types were identified, and the distribution of Si, Mg, C and S in these macerals was determined by the electron probe of this instrument. This research showed that the mineral matter was concentrated in the semifusinite portion of this coal.

### **Brittle Fracture in Steels**

A knowledge of the conditions controlling the fracture of structural materials is essential to their effective utilization in engineering applications. In the Yukon Territory and Northwest Territories, where low ambient temperatures increase the susceptibility of steels to brittle fracture, information regarding those factors that contribute to such behaviour and govern the fracture characteristics is particularly important. Research is continuing on this problem as it pertains to structural steels, which are sensitive to temperature and straining rate and also to high-strength alloy steels which are less susceptible, but which are more expensive.

Considerable progress has been made in the application of fracture mechanics theory to high-strength steels, and has led to a much improved understanding of the mechanism of fracture. Experimental data confirmed the theoretical deductions and showed that the nature of the fracture obeyed certain well-defined principles, even in the presence of several per cent of plastic flow.

Apart from this fundamental research, a number of investigations have been made in cases where brittle failure has occurred in ships, pipelines and other structures. In particular, several instances of brittle failure in pipelines have been investigated and these were found to have initiated from faulty welds, "hard spots" in the pipe metal, mechanical damage and corrosion-cracking. This work was done as part of a continuing program of work for the National Energy Board. Advice has also been offered to this body on such topics as local and national specifications related to pipelines, welding at low ambient temperatures in northern Canada and the properties and fracture susceptibility of the new high-strength pipeline steels.

### **Notch-Toughness of Steels**

The notch-toughness of steel is apt to drop to low levels at low temperatures and this characteristic is of primary concern for service in northern Canada.

Work is in progress to develop high-strength cast steels with acceptable toughness. The first phase, dealing with nickel-vanadium steels suitable for ice-breaker service, has been completed. Later work has been concerned with nickel-chromium-molybdenum and nickel-cobalt alloy cast steels with a similar strength level and this work is still in progress. Maximum toughness has been throughout a prime consideration and has been sought by studying the effect of variations of steel composition and steelmaking procedures.

Other work on high-strength steels includes a study of the comparatively new T.R.I.P. steels which have unique ductility for this strength level, continued investigation of the copper-nickel steel developed within the Branch and a fundamental study of fracture in the ultra-high-strength steels.

Toughness studies are also being carried out on carbon and low-alloy structural steels. The effect of mill-processing variables in rolling on notch-toughness is being

studied on some commercial 2 1/4 in. thick G40.8 Grade B steel. This thick plate is being re-rolled under controlled conditions of temperature, pass reduction and cooling rate. The optimum conditions for strength and low-temperature toughness are being determined, and the properties obtained correlated with the micro-structure. Research is continuing on composition and in particular on the effect of small additions of titanium and zirconium on the notch-toughness and mechanical properties of low-alloy structural steel. A short investigation has also been carried out on the effect of forming a U-shaped section for an orthotropic plate deck bridge by cold bending. The effect of the non-uniform strain of 0-4.3 per cent was comparable to that of a uniform strain of 2 per cent. Subsequent aging had little additional effect.

The through-thickness properties, and particularly notch-toughness, of structural steel plate is sometimes cause for concern. This was the case, for example, on the construction of a sea-going off-shore oil-drilling rig to operate off Victoria, B.C. Research is in progress to study the effect of deoxidation practice on the size and shape of the non-metallic inclusions, which control the through-thickness properties. The results of these studies will be of special interest for similar exploration in the North.

### **Protection and Maintenance of Steel Structures**

Minimum maintenance is highly desirable for steel structures erected in the North. The advent of "self-painting" steels which develop an adherent oxide coat on weathering is therefore of special interest. In order to best advise the Department of Public Works about the use of such steels for bridges in northern Canada, a study was made of existing bridges in Ontario, Quebec and Michigan. After this, a program of research was started to examine the weathering characteristics of commercial and experimental steels. The latter are designed to investigate the effect of steel composition, paying close attention to the problem of maintaining notch-toughness, which is so necessary for low-temperature applications. An important feature of the program will be an attempt to develop laboratory methods for the accelerated testing of weathering characteristics.

An alternative and more familiar protective method for steel structures is galvanizing. However, information is limited on the application of galvanizing to large welded structures, and welded bridges in particular. Some time ago it was foreseen that under some circumstances a problem of embrittlement might result from the successive application of welding, pickling and galvanizing. A research program has therefore been undertaken to examine this possibility thoroughly. The results have already indicated that no serious problem need be anticipated in normal practice. This work will clear the way for the trial use of galvanized steel bridges and other structures.

Metal priming paints used first for ship-building are finding increasing application and it has been claimed that it is possible to weld protected steel without first removing the primer, which would offer considerable cost savings. An investigation has been carried out to test this claim and as a result the idea has been approved, with some qualifications.

### **Plans for 1970 Operations**

The Department of Public Works is to arrange for the construction of a bridge in "self-painting" steel on the Alaska Highway for trial purposes. To assist this project a Materials Specification has been prepared by Mines Branch on "Proposed Unpainted Bridge on the Alaska Highway".

Work reported last year on the dynamic effect of a sudden small increment of brittle fracture under static loading at low temperatures indicated the importance of dynamic toughness in structural steels even under static loading conditions. Equipment for the direct measurement of this property has been constructed and will be used for an investigation of the effect of thickness over the range 1/4 in. to 2 in. with G40.8 structural steel plate.

Technical and scientific services will be provided for assisting in the opening of new mines, for increasing mineral production in the Territories and for solving production problems of petroleum and natural gas. Scientific advice will be available and investigations will be undertaken as required on northern problems related to metals, minerals, fuels, petroleum and natural gas.

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### OBSERVATORIES BRANCH

#### Responsibilities

The Division of Seismology operates seismic observatories at Alert, Mould Bay, Resolute, Coppermine, Frobisher, Inuvik, Yellowknife, Baker Lake, Churchill, Great Whale River, Schefferville and a large seismic array near Yellowknife. The seismicity of the Arctic is studied. In addition, research is conducted on earthquakes recorded in the Canadian North. In co-operation with the Polar Continental Shelf Project, crustal seismic refraction studies are undertaken. Geothermal research is also carried out through the Canadian North.

The Geomagnetic Division measures and charts the magnetic field, operates a network of magnetic observatories and conducts research into the structure of the upper atmosphere and solid earth by geomagnetic methods.

#### Long-Term Plans

It is planned to improve the coverage of local earthquakes in the Yukon by the installation of a second-order seismic station at Whitehorse. The Division intends to continue its studies of the crust and upper mantle in the Canadian North, and to continue geothermal research from the ice, in lakes and in boreholes abandoned by oil companies and drilled for the Pan-Arctic Project. The seismic array at Yellowknife will be modernized and its long-period capability slowly increased by the addition of radio-linked out-stations.

To reoccupy magnetic repeat stations at three- to five-year intervals; to conduct three-component airborne magnetic surveys at five to ten year intervals; to operate permanent and temporary magnetic observatories.

#### Review of 1969 Operations

The seismic stations listed above operated continually as did the seismic array. Equipment was modernized at a number of stations, including the array. Coppermine observatory was closed down at the end of the year.

Geothermal measurements were made near Prince Patrick Island, near Yellowknife, in the interior of the Yukon Territory and on Ellesmere Island.

A major deep seismic refraction-wide angle reflection sounding experiment was completed in July 1969 in the Yellowknife-Fort Rae area and the results are now being evaluated.

The new Seismic Zoning Map for Canada was completed and officially adopted for National Building Code purposes January 1, 1970. It shows the best estimate at the present time of the seismic risk in the Canadian Arctic.

Twelve magnetic stations were reoccupied in the Eastern Arctic to determine the secular variation of the earth's magnetic field. A three-component airborne magnetic survey, with flight-lines 20 miles apart, covered northern British Columbia and

Alberta and parts of the Yukon and Northwest Territories. Six magnetic observatories recorded the earth's field continuously through the year, at Alert, Mould Bay, Resolute, Baker Lake, Churchill and Poste de la Baleine. Temporary magnetic recording stations were operated at Meighen Island and Cape Morris Jesup (Greenland) in a continuing investigation of the Ellesmere Island anomaly of electromagnetic induction. Paleomagnetic collections were made in the Yellowknife region.

### **Plans for 1970**

The seismological observatory program will be continued. A program of updating instrumentation at Yellowknife will be accelerated this year. Geothermal research is planned on a continuing basis in the N.W.T. and the Yukon.

Twelve magnetic stations will be reoccupied in the Western Arctic to determine secular variation. A three-component airborne magnetic survey is planned to cover the Arctic Ocean and Queen Elizabeth Islands at a line-spacing of 30 miles. It will extend from the 70th parallel to the Greenwich meridian. The six permanent magnetic observatories listed above will continue in operation. Temporary magnetic recording stations will be operated on Banks Island and Holman Island.

## DEPARTMENT OF ENERGY, MINES AND RESOURCES

### Polar Continental Shelf Project

#### Responsibilities

To carry out a long-term investigation of the continental shelf region lying north of the mainland of Canada and north and west of the Canadian Arctic Archipelago, including the sea floor and the Earth's crust and mantle beneath it, and the waters above it; together with the islands of the archipelago, the straits and sounds between the islands, and the adjacent mainland where relevant. The investigations comprise mainly those fields of survey and research for which the Department of Energy, Mines and Resources is responsible in other parts of Canada, wherever such study is not more economically and efficiently pursued as a separate self-contained operation; but it is also designed to include or to support worthwhile researches in fields outside those normally undertaken by the Department if such researches are in the national interest and could not otherwise be carried out. An important function of the Project is to co-ordinate and to arrange for mutual or concerted action by various agencies whose diverse specialties or capabilities can be brought to bear on different but related aspects of a major Arctic problem or critical area of study; and to provide continuity of planning and operation for various studies the separate activities of which are short term and focussed on individual problems. Emphasis is placed on field research and survey, but basic laboratory or theoretical research is carried on as needed to aid in the investigations, or in the interpretation of field data; and equipment or technique development or experimentation is undertaken as relevant. In addition, the field facilities of the Project are made available, under certain conditions, to approved university and other non-government research groups.

#### Long-Term Plans

The field survey and research activities will eventually cover all of the Canadian sector of the Arctic continental shelf of North America, those parts of the Arctic Ocean basin that are of interest to Canada, and those parts of the Arctic Archipelago and Arctic mainland not investigated by other agencies in the fields of interest to the Department of Energy, Mines and Resources. It is intended that the program coordinating and logistics support functions of the Project shall be made available, where appropriate and approved, to scientific activities of interest to the Government of Canada in any part of Arctic Canada or the adjacent oceans.

#### Review of 1969 Operations

From 1959 to 1968, field work was concentrated in the western archipelago and the continental shelf adjacent to it, with individual studies from the Mackenzie delta to northern Greenland to the North Pole. In 1969, field activities were carried out from January until October with limited winter studies in late November and December. The location of the studies ranged from the lower Mackenzie River Valley to the North Pole and northern Greenland, and the Project contributed to certain programs in southwestern Yukon and the Canadian Rockies. The main bases of operation were Tuktoyaktuk, Resolute and Alert.

In addition to the various units of the Department of Energy, Mines and Resources, the following agencies were involved in or received assistance from the 1969 program of the Polar Continental Shelf Project:

Department of Fisheries and Forestry  
Department of Indian Affairs and  
Northern Development: Canadian Wildlife Service  
Department of National Defence  
Department of Transport  
National Museums of Canada  
National Research Council  
Quebec Wildlife Service  
United Kingdom Ministry of Technology  
U.S. Army Cold Regions Research and  
Engineering Laboratory  
Department of Sea and Shore Fisheries,  
State of Maine  
Arctic Institute of North America  
University of British Columbia  
University of Calgary  
Hokkaido University  
University of Massachusetts  
McGill University  
McMaster University  
Memorial University, Newfoundland  
University of Michigan  
Ohio State University  
University of Ottawa  
University of Washington

The following is a summary of the principal field activities in 1969:

1. *Geology, marine*: Mackenzie River delta and inner Beaufort Sea;

A continuing study, carried out in co-operation with Bedford Institute, of the geology of the sediments, the processes of sedimentation and the present and past organisms of the sea floor in the Arctic delta environment.

2. *Geology, terrestrial; palaeontology*: central arctic archipelago;

A detailed study by the Geological Survey of Canada, supported by the Polar Continental Shelf Project, of the faunal variations in selected Palaeozoic formations within the Franklinian geosyncline, of importance to the understanding of the stratigraphy of this economically promising area.

3. *Geology, terrestrial; physical geography and geomorphology*: Mackenzie River delta;

A continuing study by the Geological Survey of Canada and the University of British Columbia with support by the Polar Continental Shelf Project, of the nature and distribution of permafrost in the Mackenzie River delta, of the characteristics and mechanics of development of permafrost land forms, with

special reference to the development of pingoes and the occurrence of permafrost around lakes and at the ocean shore. A small amphibious air cushion vehicle was used extensively for transport, in an evaluation of its usefulness in support of field parties on Arctic coastal terrain.

4. *Geology, terrestrial; geomorphology*: Banks Island;

A continuing study, involving the Geological Survey of Canada and the universities of Calgary and Ottawa, of the recent geological history and the development of landforms in western and central Banks Island.

5. *Geology, terrestrial; Quaternary, geobotanical studies*: Banks Island;

A study by the Geological Survey of Canada of peat deposits and mapping of vegetation types to determine the recent geological evolution of the western Arctic Islands.

6. *Geology and Geophysics, terrestrial; seismic studies of permafrost*: Mackenzie River delta;

A shallow seismic survey of the thickness of permafrost and the structure of the poorly consolidated sedimentary deposits of Tyktoyaktuk peninsula, undertaken by the Geological Survey of Canada in collaboration with university studies.

7. *Geology, terrestrial; stratigraphy*: Caribou Hills;

A study by the Geological Survey of Canada of details of the stratigraphy and structure of Mesozoic formations in the lower Mackenzie River Valley.

8. *Geomagnetism*: Meighen Island and northern Greenland;

Measurements, by the Observatories Branch, of the nature of variations of the Earth's electromagnetic field along the edge of the Arctic Ocean basin on either side of a strong conductivity anomaly previously studied in the Alert-Robeson Channel area at the northeast edge of the Canadian Arctic Archipelago.

9. *Glaciology*: Melville Island icecaps;

A continuing study of the mass balance and morphology of these thinnest and driest of North American arctic glaciers, with surveys of accumulation, wastage and movement, and detailed aerial photography.

10. *Glaciology*: Meighen Icecap, Meighen Island;

A continuing study of the physics of a small polar ice mass, with experiments to determine the thermal and dynamic relationships of ice in a high arctic environment. Studies were also continued of the crystallography and internal structure of the ice mass, with a view to determining its history and the climate during the recent geological past.

11. *Climatology*: Meighen Icecap, Meighen Island;

A continuing study, in co-operation with the National Research Council and McGill University, of the present behaviour of a small high arctic icecap and its

influence on and reactions to the local climate, with emphasis on the energy exchange between the atmosphere and the Earth's surface of known uniform physical properties.

12. *Geodesy, gravity, oceanography*: North Pole;

A multi-discipline investigation, in which the Observatories Branch, the Geodetic Survey and scientists from universities and commercial research organizations collaborated, of the region near the North Pole and along meridian 60° West to determine the shape of the geoid, the regional and local gravity field, the topography of the ocean floor, the physical and biological oceanography, the tilt of the ocean surface, the pattern of ice drift, the nature of the sea ice, and the structure of the sub-bottom sediments; with a comparison of celestial, satellite and electromagnetic (Omega) methods of position determination.

13. *Gravity*: Beaufort Sea;

Regional mapping by the Observatories Branch at a scale of 1:500,000 of the gravity over the continental shelf and continental slope in the Beaufort Sea, with readings tied to base stations on the mainland and Banks Island.

14. *Gravity*: Mackenzie River delta;

Regional mapping by the Observatories Branch at a scale of 1:250,000 of the gravity over the lower Mackenzie River Valley and delta.

15. *Heat Flow*: Melville Island, Ellesmere Island, Greenland;

Measurements by the Observatories Branch of the flow of geothermal heat from the Earth's crust at selected Arctic locations, with readings taken in drill holes and at the bottom of thermally stable lakes.

16. *Hydrography*: Beaufort Sea and Arctic Ocean;

Hydrographic survey, for charting at a scale of 1:500,000, by sounding through the ice at intervals of approximately six kilometers, over the continental shelf and continental slope between the Mackenzie River delta and Banks Island.

17. *Hydrography*: Coastal areas of Beaufort Sea;

Hydrographic survey, for charting at a scale of 1:100,000, by continuous profile sounding over parts of the submerged delta of Mackenzie River, with evaluation of potential sites for harbours for supertankers. Much of the work was accomplished using an SRN-6 hovercraft as the survey vehicle.

18. *Photogrammetry, terrestrial, of glaciers*: Axel Heiberg Island, Ellesmere Island, Meighen Island;

Surveys of selected glaciers and icecaps, as part of an investigation by the Inland Waters Branch of the applicability of photogrammetric methods to measurement of movement and volume change of ice masses.

19. *Position determination: North Greenland;*

The determination of the position of a number of selected points along the north coast of Greenland, was undertaken by the Polar Continental Shelf Project and the Department of Transport in a test of astronomic and radio (Omega) methods of navigation at high latitudes. One result of this work was that errors in the present maps were reduced, and the northernmost point of land above sea level was determined to be Kaffeklubben Island, off the northeast coast of Greenland.

20. *Position Determination: Arctic Ocean and Beaufort Sea;*

An evaluation of the signal strength and stability obtainable with the Omega navigation system in high latitudes, and of its accuracy compared with that of the Decca Lambda system, was undertaken in the Beaufort Sea area in co-operation with the Department of Transport.

21. *Sea Ice surveys: Arctic archipelago and adjacent Arctic Oceans;*

For the ninth successive year, a systematic aerial survey was carried out of the distribution, nature and movement of sea ice from mid-March to mid-October in all the main channels of the archipelago and in the adjacent Beaufort Sea and Arctic Ocean. Additional reconnaissance observations were made of Beaufort Sea during the winter months.

22. *Sea Ice investigations, Manhattan Project: Parry Channel and Prince of Wales Strait;*

The thickness, temperature profile, salinity distribution and structure of the sea ice at selected locations were determined in May and early June along the route that the tanker *U.S.S. Manhattan* proposed to take in late summer, to obtain early-season physical characteristics of the ice which could be related to measurements taken at the time of passage.

23. *Sea-ice dynamics: Kugmallit Bay;*

A continuing study is underway of the stress and strain relationships of the annual sea ice in Kugmallit Bay near Tuktoyaktuk and immediately offshore from the Mackenzie River delta, to determine the forces generated in the ice by temperature changes, wind and other factors.

24. *Thermal imagery: Tuktoyaktuk and Arctic Ocean;*

A field study was completed of the thermal characteristics of the surface of snow-covered frozen land, frozen freshwater lakes and various types of sea ice, as recorded from aircraft and compared with soil and snow temperatures along selected test lines. This technique holds promise for a reliable method of determining the characteristics of the surface of snow or ice-covered terrain from the air.

Support was also provided for:

25. A study of underwater sound generation and propagation beneath various types of sea ice in Parry Channel;

26. Archaeological studies in the Mackenzie delta region;
27. A continuing comprehensive biological and ethological investigation on Bathurst Island;
28. A study of marine zooplankton in the Beaufort Sea;
29. A survey of the marine algae along the shores of the western Arctic mainland and the western islands of the archipelago;
30. A survey of the small mammals of the coastal Yukon and western Mackenzie district;
31. A study of the nesting of greater snow geese on northern Baffin Island and southern Ellesmere Island;
32. Biological and glaciological investigations on northern and eastern Devon Island;
33. A continuing study of the physical oceanography of the "North Water" in Kane Basin and Smith Sound;
34. Palaeozoic palaeontology and petrology on northern Banks Island;
35. A reconnaissance of sea ice in the fiords of the northern archipelago, preparatory to future detailed experimental studies;
36. A study of the occurrence, behaviour and nutrition of marine algae beneath sea ice in Jones Sound;
37. A multi-disciplinary study of the glaciers and glacial environment on Axel Heiberg Island;
38. A study of the change of albedo and radiation from a melting sea ice cover in the Beaufort Sea;
39. A study of coastline and land form development and the processes of soil formation on southwestern Devon Island;
40. A comparative study of the chemical nutrients in the water of glacier-fed and non-glacier fiords in the Jones Sound area;
41. Studies of the damage to tundra terrain and of the performance on land and water of an air cushion vehicle under Arctic conditions;
42. Studies of the water chemistry and quality in the Tuktoyaktuk area;
43. Geomorphological studies on Baffin Island;
44. Systematic observations of surface weather in the Mackenzie Delta-Beaufort Sea region.

## Plans for 1970

The 1970 program will be, in the main, a continuation of that of 1969. The main emphasis for regional and systematic surveys will be placed in the Beaufort Sea area. Hydrographic surveys and both regional and special studies of sea ice will receive special attention, in anticipation of the demand for information relevant to transportation and resource development in that region. Several ship-borne investigations of the Department of Energy, Mines and Resources are also planned for the Beaufort Sea region in 1970, and these will be co-ordinated with the Polar Continental Shelf Project activities. In addition to the work in the Beaufort Sea and lower Mackenzie River area, which will be carried out mainly from the base at Tuktoyaktuk, studies will be continued throughout the archipelago, co-ordinated from Resolute. The glaciological and climatological work on Meighen Island and on Melville Island will be continued through 1970 and it is hoped that the major biological program on Bathurst Island can be continued. Consideration is being given to possible support of the high Arctic studies of the International Biological Program.

It is expected that the 1970 field program will engage a total of about 105 persons, including personnel under contract and crews of supporting aircraft. Aerial transport in the field will be provided by one Bell 204B helicopter, one Bell 205A helicopter, one Bell 47G4 helicopter, two de Havilland DHC-3 Otters, one Beechcraft D-18S aircraft, one Bristol 170 freighter aircraft and one Westland SRN-6 hovercraft. Ground transport includes seven wheeled or tracked vehicles and about 15 motor toboggans and small amphibious vehicles. The offshore studies will be co-ordinated with vessels *Richardson*, *Parizeau*, *Hudson* and *Baffin*, as appropriate and it is expected that further field studies will be made in connection with planned voyages of U.S.S. *Manhattan* to the Arctic in 1970. In addition to the base camp at Tuktoyaktuk and the facilities at Resolute, the 1970 program requires that the Polar Continental Shelf Project operate camps at Herschel Island, Hooper Island, Atkinson Point, Meighen Island, Melville Island, Bathurst Island and a camp on the ice off Beaufort Sea.

## DEPT OF ENERGY MINES AND RESOURCES

### SURVEYS AND MAPPING BRANCH

#### GEODETTIC SURVEY OF CANADA

##### Responsibilities

The responsibilities of the Geodetic Survey in the North are to provide frameworks of precise horizontal and vertical control that serves as the basis for surveys of lesser accuracy which may be carried out by other government agencies or by private enterprise. These precise surveys also provide basic information for research in the solid earth science. The Geodetic Survey is also responsible for surveys to provide control for mapping in the North and also to provide special surveys as required for the development work of other agencies.

##### Long-Term Plans

The long-range plans for northern operations include the densification of the precise horizontal control framework and the provision of control for 1/50,000 mapping. These operations will take place simultaneously in the regions being controlled using Aerodist, which is an airborne survey system capable of carrying out both functions in the most economical manner. Special surveys and control surveys for mapping will also be required to supply mapping which is urgently needed and cannot be scheduled for inclusion in the aerodist program.

##### Review of 1969 Operations

Aerodist operations established 24 new first-order and 13 second-order geodetic horizontal control stations in a belt approximately 120 miles wide, which extended along the Mackenzie River from the vicinity of Wrigley, N.W.T. to the Arctic coast north of Inuvik. Seven Shoran stations were tied in and six navigational aids positioned. Control was established for 377 1/50,000 map sheets over an area of 98,800 square miles. The mapping control work required 5,020 line miles of photography, 5,170 line miles of A.P.R. control and 5,020 line miles of photo A.P.R.

In the Northwest Territories a second-order horizontal control traverse was established along the highway between Yellowknife and Fort Rae. The traverse was used to determine the position of a closely-spaced series of points along the highway which were used as positional control in a seismological study carried out by the Observatories Branch. The traverse will provide horizontal control for legal surveys in the area and the traverse stations were photo-identified for mapping control.

Mapping control operations for 1/50,000 mapping were carried out in Manitoba, Quebec and Labrador. Control for 11 sheets was established north and east of Berens River, Manitoba; and, in Quebec, control was established for 70 sheets in the Mistassini Lake area, and for 16 sheets in the Ivugivik area at the northwestern tip of Ungava. In Labrador, control for 104 sheets was established along the coast north and south of Lake Melville.

First-order vertical control was established between Esker Lake and Sail Lake in the Churchill Falls area of Labrador, and in the vicinity of Thompson in northern

Manitoba. This work provides vertical control for mapping, engineering and hydraulic projects.

### **Plans for 1970 Operations**

Aerodist operations will be continued in the Yukon and Northwest Territories. The network will be extended westward from the Inuvik area to connect with existing surveys along the Alaska boundary and then eastward to cover the area between the Arctic coast on the north, Great Bear Lake on the south and Coppermine on the east. Aerodist photo control for 1/50,000 mapping will be established throughout these areas, and existing lower order surveys will be connected to the Aerodist framework.

Mapping control operations for 1/50,000 mapping will be carried out in a large block in the District of Keewatin. This block will extend from the 60th parallel to Baker Lake in the north, and from the Hudson Bay coast to the District of Mackenzie boundary on the west.

Vertical control operations in the vicinity of Thompson, Manitoba, will be completed in the winter season, February-March, 1970.

## **LEGAL SURVEYS**

### **Responsibilities**

To manage and execute surveys to enable land or resource transactions involved in the administration and development of public or other lands.

### **Long-Term Plans**

The long-term plans of this Division are dependent upon the planning and development programs of other government departments. It is planned to execute subdivision surveys in each settlement in the North, the amount of yearly work being determined by the development of these settlements by the Department of Indian Affairs and Northern Development. Similarly, surveys of group lots, camp sites and other parcels will be executed as highways are built by the Territorial governments in the North. Other work, such as the laying out of lots for airstrips, will depend upon the progress made by the Department of Transport in this field. It is intended to establish Coordinate Control Surveys in the major settlements of the North.

### **Review of 1969 Operations**

#### **Yukon Territory**

A 121-lot subdivision was surveyed at Carcross cut-off by a private survey firm under contract to the Department. (This subdivision has been named "The Golden Horn"). Extension of the Whitehorse Coordinated Survey Area was to be completed in 1969, but reconstruction of the Alaska Highway forced postponement. Reference bars were placed for 25 of the control monuments in the present area.

## **Northwest Territories**

Subdivision surveys were executed by staff surveyors at Clyde River (80 lots), Coral Harbour (61 lots), Rankin Inlet (154 lots), Frobisher Bay (79 lots), Fort Resolution (78 lots), Edzo (161 lots), Fort Smith (8 lots) and Pine Point (3 lots). A total of 17 parcels of land were surveyed in Hay River, Pine Point, Fort Simpson, Lac la Martre and Inuvik for such purposes as ranger stations, road rights-of-way, a cemetery, a site for Canadian National Telecommunications, a homestead, an airstrip, trailer lots and a "boat haulout".

Surveys to locate non-directional radio beacon sites for the Department of Transport were made at Fort Smith and at Rankin Inlet.

In addition subdivision surveys at Inuvik (145 lots) and Cambridge Bay (33 lots) were made by private surveyors under contract to the Department.

## **Alberta**

Resurveys of the boundaries of four Indian Reserves in the Wabasca area were completed.

## **Manitoba**

Resurveys of the boundaries of two Indian Reserves, one at Brochet and one at Nelson House, were carried out.

## **Plans for 1970**

### **Yukon Territory**

Extension of the Whitehorse Coordinated Survey Area, which was postponed in 1969, is planned for 1970. Also included in the proposed 1970 program are the survey of a cottage lot subdivision at Watson Lake, 12 parcels for various purposes such as a mine rescue station, campgrounds, a school site, a grader station and historic sites; also surveys are required of lands taken for Alaska Highway reconstruction in the Whitehorse area. Control for two non-directional radio beacon sites in the Whitehorse area will be established.

### **Northwest Territories**

Subdivisions at Hall Beach, Lake Harbour, Igloolik, Chesterfield Inlet, Repulse Bay, Coral Harbour, Arctic Bay, Frobisher Bay, Eskimo Harbour and Pond Inlet are proposed; surveys of 15 parcels or lots for reservation of sites for transmitter equipment, a seismic vault, campgrounds, highway maintenance camps, etc., are required; resurveys of portions of subdivisions at Gries Fiord and Fort Providence may also be required. Control for non-directional radio beacon sites at Chesterfield Inlet and Repulse Bay have been requested.

### **British Columbia**

Survey of the boundaries of a new Indian Reserve near Atlin is to be undertaken.

## **Alberta**

Resurvey of all or parts of four Indian Reserve boundaries in the Fort Vermilion and Wabasca areas is on the program. Some internal subdivision is also needed in two of these reserves.

## **AERIAL SURVEYS**

### **Responsibilities**

To produce and maintain the National Topographic series of maps at the 1/25,000, 1/50,000 and 1/250,000 scales; to administer through the Interdepartmental Committee on Air Surveys the acquisition of aerial photography for mapping and development purposes.

### **Long-Term Plans**

The long-term plans of the Division are to extend 1/25,000 mapping coverage of urban and suburban districts as required; to complete mapping coverage of Canada at the 1/50,000 scale, observing priorities of map users, and to maintain up-to-date the 1/250,000 map coverage of Canada.

### **Review of 1969 Operations**

Mapping at the 1/250,000 scale was completed for Mansel, Coats, Nottingham and Salisbury islands in Hudson Bay.

Mapping at the 1/50,000 scale was done for 120 sheets, representing 35,000 square miles in Labrador, Churchill River basin, Lesser Slave Lake district, Nahanni and Redstone River areas in N.W.T. and a number of sheets in western Yukon.

Photomaps at the scale of 1/31,680 were prepared for 58 sheets or 18,000 sq. miles mainly in the vicinity of Coppermine, N.W.T.

Special plots at larger scales were made of Arctic Bay, N.W.T.; Steele Glacier, Y.T. and Yellowknife Airport. Plots of thirteen northern settlements were updated.

Aerial photography was obtained for only 11,000 square miles of the 54,000 square miles contracted.

### **Plans for 1970**

Mapping at the 1/50,000 scale is proposed for about 200 sheets representing 60,000 square miles in northern Labrador and Quebec; Churchill River basin; Rankin Inlet; Fort Chipewyan and Mackenzie Highway, Alta.; Nahanni River basin, N.W.T., and of the Van Gorda and Crest mining areas, Y.T.

Updating of plots of a number of northern settlements will continue for the Department of Indian Affairs and Northern Development.

Aerial photography for mapping is proposed for 150,000 square miles in the regions of Great Slave Lake, lower Mackenzie Valley, Whitehorse, Coppermine and northern Saskatchewan.

## MAP PRODUCTION DIVISION

### Responsibilities

To publish the National Topographic series of maps produced by Aerial Surveys and to produce and maintain smaller scale series of maps such as aeronautical charts, parks and atlas maps.

The continuing program comprises periodic revision of aeronautical charts and other small scale maps, publication and distribution of the National Topographic series of maps and provision of specialized reproduction services for other branches and departments.

## DEPARTMENT OF ENERGY MINES AND RESOURCES

### TASK FORCE ON NORTHERN OIL DEVELOPMENT

#### ENERGY DEVELOPMENT

In December 1968 a governmental Task Force on Northern Oil Development was established to study all aspects of the oil situation in the North including transportation possibilities. As a result of the Prudhoe Bay oil discovery in northern Alaska and the increasing exploration activity in the Mackenzie Delta area and the Arctic Islands of northern Canada, a new pattern of continental oil supply is emerging in which Canadians will have a direct interest. During 1969, the Task Force on Northern Oil Development, consisting of the Deputy Ministers of the Departments of Energy, Mines and Resources, Indian Affairs and Northern Development, Transport and the Chairman of the National Energy Board, examined exploration, transportation and marketing developments related to northern oil activity for the purpose of advising the Canadian Government on matters of national interest.

# **DEPARTMENT OF EXTERNAL AFFAIRS**

## DEPARTMENT OF EXTERNAL AFFAIRS

### Responsibilities

The Department of External Affairs is concerned with any activities in the north conducted on behalf of or in cooperation with foreign governments or their agencies, including scientific or other projects in both the civil and military spheres. The Department is responsible for consulting the appropriate departments with respect to official applications for foreign scientists and explorers to carry out research in the Arctic as well as clearances to foreign vessels intending to engage in scientific research or exploration in Arctic waters. Through membership on the Advisory Committee on Northern Development, the Sub-Committee on Arctic Research and other sub-committees, the Department provides advice on matters with foreign policy implications and also has responsibility in connection with the negotiation of agreements with other countries arising out of Arctic activities. The Department similarly has an advisory, coordinating and operational role in matters of international law and policy with respect to the status and uses of the waters adjacent to the Canadian Arctic islands, including in particular navigation and pollution control as well as the exploration and exploitation of the offshore resources underlying these waters.

**DEPARTMENT OF FISHERIES  
AND FORESTRY**

## DEPARTMENT OF FISHERIES AND FORESTRY

### FISHERIES SERVICE

#### Responsibilities

To achieve rational and economic utilization of the fishery resources available to Canadian fishermen by maintaining, protecting and increasing the stocks of valuable fish to commercial and recreational fishermen; maintaining, protecting and improving the physical and biological environment of the fishery resources; protecting the Canadian interest in international fisheries; introducing improved harvesting techniques and encouraging the development of new fisheries; formulating and enforcing regulations to ensure the highest quality of processed fish and to provide the fish processing and distribution industries with technical advice; encouraging and assisting the realization of maximum economic returns from the fishery resources.

#### Long-Range Plans

The programs being developed, which present priority requirements, are as follows:

- a) The implementation of a bio-economic investigation to develop a more precise management program for Great Slave Lake and others;
- b) The implementation of a comprehensive pollution control program;
- c) The placing of increased emphasis on the sanitary quality of fish products. Priority will be given to plant registration requirements and production of a sanitary commodity;
- d) Active participation in a northern waters program and increased attention to productivity of the sea coasts and high Arctic for the benefit of native people;
- e) The implementation of a multi-discipline program to develop a sport-commercial rationale;
- f) Evaluation of the Control Area Program;
- g) The initiation of an inventory oriented investigation of the Mackenzie system, with emphasis on the Delta area and its potential productivity; and
- h) An expanding program to meet new industrial problems and to meet problems and opportunities related to the recreational and commercial fisheries.

#### Review of 1969 Operations

Extensive travelling by officers of the Department was carried out in order to observe operations, gather statistical and biological data, enforce regulations, effect test fishing and lake survey work and to liaise and collaborate with other government agencies on the many diversified activities connected with the fisheries of the North. Lake surveys resulted in more lakes being placed on the growing list reserved for angling and domestic purposes with Great Slave Lake continuing to be the main source of commercial supply.

In order to provide sport fishing opportunity within the locality of the township of Watson Lake, the program to stock Wye Lake, which began in 1967, was continued in 1969 and additional trout fry were planted. Incubation sites were also utilized on two creeks flowing into Wye Lake and the fry emersion results from planted eggs were encouraging. The conclusions to date are to the effect that Wye Lake can be expected to support stocks of rainbow trout and possibly other species of attractable sport fish.

A senior biologist was appointed to the Central Region in 1969. The immediate purpose of this appointment is to plan an effective program of resource development for the Northwest Territories and to liaise with officials from other federal agencies and those of the provinces.

Due to technological advances in the fishing industry increased attention was necessitated for the inspection of fish products, the analysis of water and ice used on fish and for clean-up in plants, the handling and processing of fish, the sanitary operation in plants and providing technical advice and assistance to industry in solving problems associated with various aspects of fisheries operations. The stationary inspection laboratory which was erected in 1968 at Hay River provided excellent service under the supervision of a highly competent quality control specialist.

## **FISHERIES RESEARCH BOARD OF CANADA**

### **ARCTIC BIOLOGICAL STATION (Ste. Anne de Bellevue, Que.)**

#### **Responsibilities**

Biological investigations in waters north of 60°N of marine and anadromous fishes and of marine mammals and their aquatic environment, with special emphasis on assisting fisheries developments by advising the Department of Indian Affairs and Northern Development through the Fisheries Service of the Department of Fisheries and Forestry.

#### **Long-Term Plans**

Continuation of the biological assessment of fisheries resources in order to provide a sound basis for maximum sustained yield, with particular emphasis on arctic char and ringed seal; some expansion of year-round marine productivity studies now carried on at Frobisher Bay, which provide baseline values for future assessment of likely undesirable changes in the aquatic environment.

### **Review of 1969 Operations**

#### **Marine Mammals**

An aerial survey of moulting ringed seals holed up on fast-ice, Broughton Island area, and a collection of adult females from Cumberland Sound have now completed the data necessary for thorough population assessment of this species in areas of both poor and stable fast-ice along complex coastlines. Population parameters derived from this study will help to determine ringed seal populations in other areas of the Arctic.

Important gaps in our knowledge of the life history of the harp seal are filled by collections of reproductive material and stomach contents obtained from summer migrants in Cumberland Sound.

Samples were obtained from a large proportion of the summer catch of walrus and bearded seal in the Igloodik area. Collections were made at our request by students from the Department of Geography, McGill University, who were involved in the human adaptability study of the International Biological Program. Particular emphasis was placed on analysis of feeding of the bearded seal.

Further large-scale tagging of white whales was carried out at Seal River, Manitoba. Recoveries of tags suggest that the population in western Hudson Bay is resident there. This conclusion is supported by other studies showing significant variations in body size between this population and others in the Canadian Arctic. Tagging of white whales was attempted also in northern Cumberland Sound and the Mackenzie Delta, but herding and stranding the whales presented too many difficulties to allow more than a few to be marked.

#### **Biological Oceanography**

At Frobisher Bay a marine ecology station has operated on a continuing basis since August 1967. Data collections include: meteorological features, sea-ice and snow

cover, temperature, salinity, dissolved oxygen, nutrients and chlorophyll; qualitative and quantitative analyses of phytoplankton, zooplankton and zoobenthos; and primary productivity rates.

The herbivorous zooplankton shows about a ten-fold increase between the winter minimum and the summer maximum in August. Benthic invertebrates have been found so far to comprise 280 species; in terms of biomass, these are dominated by ascidians and sponges; in number of species, by polychaetes (88), gastropods (33) and amphipods (30).

A series of measurements of chlorophyll, nutrients and flora has been started at various levels in the sea-ice, to extend over the full ice-cover period. Extremely high concentrations of chlorophyll develop at the bottom of the ice by late winter; these along with nitrate and phosphate are rapidly reduced with the onset of summer melting.

### **Marine and Anadromous Fish**

Field work was completed on measuring standing stocks of marine fish and invertebrates in Coronation Gulf, started in 1966.

Arctic char from the Kuujjua River on Victoria Island were tagged for a study of utilization. Early returns show that the fishery is relatively heavy.

Preliminary analysis of data from the Tree River sport fishery in 1969 indicates that recovery of the over-exploited Arctic char stocks is progressing satisfactorily. Catch records over the period 1962-1969 have been analysed for the highly profitable Arctic char fishery in Wellington Bay, which has operated under a 100,000-lb quota for eight years. The quota now needs careful scrutiny to prevent the possibility of over-exploitation in the near future.

### **Plans for 1970**

Field work on Arctic marine mammals will be severely restricted owing to lack of funds and personnel. Only the population study of the ringed seal will be undertaken, requiring full-time laboratory work at Ste. Anne de Bellevue, and only a small amount of field work in connection with the productivity study in Frobisher Bay.

The long-term marine ecology study under "Biological Oceanography", will have reduced field work related to plankton and benthic sampling, while detailed results of previous years are analysed and reported. The marine and anadromous fish group will take over the major part of the Frobisher Bay productivity study in 1970, with the object of:

- a) measuring the abundance of benthic marine fish per unit area of bottom at selected locations;
- b) examining outer reaches of the bay for possible concentrations of economically valuable fish species;
- c) describing qualitatively and quantitatively the food taken by each species of fish;

d) collecting information on life history of marine fish species.

The Arctic fisheries investigation will undertake to sample a new Arctic char fishery in Pelly Bay for size of individuals, growth and mortality rates, and catch per effort. Also, while the M.V. *Salvelinus* sails from Cambridge Bay to Inuvik for refit, an effort will be made to obtain distributional records of marine larval fish.

## **FRESHWATER INSTITUTE**

**(Winnipeg, Manitoba)**

### **Responsibilities**

The investigation of the fresh waters of the Northwest Territories with specific emphasis on fisheries and the aquatic environment.

### **Long-Term Plans**

The assessment of the fisheries resource, both with respect to present stocks and the productive capacity of the waters of the Mackenzie drainage basin; investigation of the present status of these waters with respect to nutrients, primary and secondary production and the quality of the environment. Of most immediate concern will be the examination of Great Slave Lake and surrounding lakes, with the aim of establishing adequate managerial procedures.

### **Review of 1969 Operations**

Work in the Northwest Territories was greatly restricted by shortage of staff and funds in 1969. However, considerable effort was directed toward the examination of the fishery on Great Slave Lake and the development of a revised scheme of management. A number of consultations were held with personnel of the Territorial Government and the Department of Indian Affairs and Northern Development. The Freshwater Institute was represented at meetings of the Northwest Territories Fishery Advisory Council.

A field crew was present during the commercial fishing operations on Lac la Martre and an analysis of the catch was carried out in addition to a limnological survey of the most heavily fished area.

### **Plans for 1970**

Work will be continued on the Great Slave Lake and Lac la Martre fisheries; the present data on all lakes in the Territories will be reviewed for both sports and commercial fisheries with a view to designing a more comprehensive program to meet the long-term needs.

## **DEPARTMENT OF FISHERIES AND FORESTRY**

### **CANADIAN FORESTRY SERVICE**

#### **Responsibilities**

To prepare forest inventories and forest management plans; to promote the adoption of improved methods of forest management and protection from fire best suited to the region; to conduct annual surveys and related research on forest insects and diseases; to provide advisory services to public and private forest management agencies on forest insect and disease control.

#### **Long-Term Plans**

To determine the potentialities of the forest resources of the North and to assist in the preparation of plans for their protection and utilization.

### **Review of 1969 Operations**

#### **Forest Management Institute, Ottawa**

The series of reports pertaining to former inventory surveys was completed during the year.

A report, including volume estimates and forest cover maps, was prepared for 860 square miles of the Lower Liard River drainage in the Mackenzie District of the Northwest Territories. Data gathered in 1955 were augmented by new sampling carried out by two officers of the Institute in April 1969.

The Institute cooperated with the Northern Economics and Development Branch of the Department Indian Affairs and Northern Development, in preparing guidelines for work undertaken by consultants in both the Yukon Territory and Northwest Territories. Subsequent reports were reviewed and evaluated by the Institute.

Officers of the Institute continued to provide advice and guidance as requested by those in the Department of Indian Affairs and Northern Development responsible for the management of the northern forests.

#### **Regional Establishment for Alberta, Yukon Territory, Northwest Territories, Calgary**

Insect and disease surveys were carried out in the Mackenzie District and Yukon Territory by staff headquartered for the summer at Fort Providence and Whitehorse. During 1969, special attention was given to surveys and research of the spruce budworm problem in the Slave and Mackenzie River drainages. A new research project was initiated to determine and evaluate the biology of this insect as an aid to developing effective control measures. Reports were distributed during and at the end of the field season to keep the forest authority aware of insect and disease conditions.

## **Plans for 1970**

### **Forest Management Institute, Ottawa**

The Forest Management Institute will continue to provide advice and recommendations related to the management and utilization of northern forests and to provide liaison with other elements of the Canadian Forestry Service.

### **Regional Establishment for Alberta, Yukon and Northwest Territories**

Insect and disease survey will again be conducted in the Territories, but there may be some change in emphasis on research of the budworm problem. Populations of the insect showed a sharp decline in 1969 and future efforts will be devoted to assessing the impact of the outbreak on forest stands and providing forest owners with advice and guidance in salvage operations. Regional headquarters for the Canadian Forestry Service will be in Edmonton as of July 1970.



**DEPARTMENT OF INDIAN AFFAIRS  
AND NORTHERN DEVELOPMENT**

**DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT**  
**CANADIAN WILDLIFE SERVICE**

**Responsibilities**

Surveys and inventories of wildlife resources; conducting research on wildlife species in relation to their habitat; collection and analysis of animal population and utilization data; recommending management procedures for particular species of economic importance; research, management and administration of migratory birds under the Migratory Birds Convention Act; co-ordination of federal, provincial and territorial action on common wildlife problems, including caribou research and management; studies on wildlife disease and pollution.

**Long-Term Plans**

To continue studies of major wildlife resources; to extend research to less-known species; to establish more adequate research facilities in the field; to assess the success achieved in management of wildlife resources to date and the potential success in this endeavour for the future.

**Review of 1969 Operations**

**Mammalogy Projects**

Preliminary studies of the range in the Reindeer Preserve have been concluded. In 1968 the management of the Canada Reindeer Project was turned over to the Canadian Wildlife Service and more intensive studies on range carrying capacity and range utilization were begun. The responsibility for the Canada Reindeer Project was accepted on a five-year term to allow time for the management measures based on sound research to be instituted.

The study of the basic nutritional requirements of barren-ground caribou, and other physiological characteristics, was continued in cooperation with the University of British Columbia.

Studies of barren-ground caribou distribution and utilization were continued. A group of five biologists studying the Manitoba-Keewatin herds intensively have now completed the first phase and will begin intensive studies on calf mortality. Studies in the first phase were concerned with population dynamics, range-carrying capacity, development and perfection of aerial survey techniques, movement, and all other parameters necessary to develop a sound management program for the utilization of the caribou.

The study of the ecology of wolves on barren-ground caribou range was concluded in 1969 and a complete report of the entire study presented.

A preliminary assessment of the feasibility of conducting a study of Baffin Island wolf ecology was undertaken northeast of Wordie Bay in 1965 and a more intensive study began in 1966 under contract with the University of Toronto. This work was concluded in 1969 and a report will be submitted in 1970.

Polar bear research was continued and trapping and marking techniques were successfully applied. Some progress was made in co-ordinating this study with those being carried out by Ontario, Manitoba and Quebec. Initial studies on radio-tracking were begun in the Churchill area and marking has continued. The study is expected to expand to include all areas of the range of the polar bear in Canada.

A study of the ecology of grizzly bears in the Kluane Game Sanctuary of the Yukon Territory was concluded in 1969. Additional biological data were obtained from bears killed by sportsmen elsewhere in the Yukon.

Studies of muskrat, beaver and mink ecology were continued in the Mackenzie Delta experimental trapping area. Carcasses from marten trapped in the Anderson River area were collected for reproductive and other biological information.

Anthrax control in bison continued in Wood Buffalo National Park and in areas north of the Park. A management plan to solve the three principal diseases affecting bison-brucellosis, tuberculosis and anthrax has been submitted for consideration. However, a vaccination and surveillance program is continuing.

Preliminary studies were begun on a game survey in Game Management Zone 12 in the Mackenzie Mountains. A research program on the life history of Dall sheep in the area was also begun. Further work is also being carried out in Zone 19 adjacent to Zone 12.

### **Ornithology Projects**

A six-year study of the breeding biology and distribution of Ross' geese in the Queen Maud Gulf area has been completed. The material gathered is presently being processed and the results will be published.

The study of factors influencing predation on goose colonies by parasitic jaegers at McConnell River, N.W.T. was concluded and a report is being prepared.

A biological assessment of geese breeding on the Great Plains of the Koukdjuak was completed and a report is being prepared for publication.

Three contracts with the University of Western Ontario were continued as part of an integrated study of the population dynamics of small races of Canada geese and snow geese at McConnell River.

A study of the population genetics of snow geese was started at La Pérouse Bay, Manitoba.

A study of the imprinting of day-old snow geese goslings was completed.

Periodic surveys of whooping crane breeding areas in Wood Buffalo National Park were continued. A record total of 12 nests was found and one egg removed from ten of them for hatching in captivity.

Investigations of ravens and whistling swans in the Mackenzie Delta continued.

An exploration of greater snow goose nesting areas was undertaken in conjunction with the Government of Quebec.

A survey was made of pesticide residue levels in peregrine falcons, gyrfalcons and the principal prey species in the Thelon, Coppermine and Bathurst Inlet areas.

A survey of the economic impact and utilization of wildlife in the Mackenzie Delta was continued.

### **Plans for 1970**

#### **Mammalogy Projects**

The intensive study of the Manitoba-Keewatin caribou herds with special emphasis on determining the factors responsible for high calf mortality will be continued as a scientific team effort. Termination reports on data gathered will be submitted.

The research project on Dall sheep in the Mackenzie Mountains will continue with more intensive field studies on the biology of the sheep. An inventory of other mammals in Zone 12 and Zone 19 will be continued.

Work on bison in the Northwest Territories and in Wood Buffalo National Park will continue with more emphasis on putting management disease control measures into effect.

Research will continue on the nutritional requirements and the physiological characteristics of barren-ground caribou and reindeer.

A study of wolf ecology on Baffin Island was conducted in 1969 and a report in the form of a doctoral dissertation will be submitted in 1970.

Polar bear research will continue, with emphasis on tagging and radio-tracking to obtain information on movements and life history.

Field studies on grizzly bears in the Yukon Territory will terminate and a report will be submitted.

Field studies of the population ecology of muskrats, beaver and mink in the experimental trapping area in the Mackenzie Delta will terminate and the data gathered will be analysed.

Studies on the high mortality found in young arctic fox will be continued in the Baker Lake area in co-operation with the University of Saskatchewan.

#### **Ornithology Projects**

We will continue the snow goose population genetics study.

There will be increased banding of snow geese at Cape Henrietta Marie and McConnell River.

There will be no change in the projects not listed as being terminated in 1969.

DEPARTMENT OF INDIAN AFFAIRS AND  
NORTHERN DEVELOPMENT

COMMUNITY AFFAIRS BRANCH

**Responsibilities**

*Housing and Community Improvement.* To provide housing assistance to Eskimos of the Northwest Territories and Arctic Quebec and to Indians of the Northwest Territories under the provisions of the following approved housing programs: Northern Rental Housing Program; and Northern Purchase Housing Program.

**Long-Term Plans**

To provide the balance, approximately 700, of the 1956 houses approved for the Northern Rental Housing Program.

To further involve the local housing associations in the administration and operation of the rental program by increasing their responsibility and authority.

To provide a second phase of the rental program to encourage integration within communities and to allow greater use of the program in utilizing Indian and Eskimo labour in the development of resource areas.

To gradually revise the present rental program to keep in step with the ability of the tenants to pay so that an awareness of the true cost of northern housing is maintained.

**Review of 1969 Operations**

Three-bedroom rental houses were constructed as follows: Frobisher Bay Region, 40; Keewatin Region, 5; Mackenzie District, 136; Arctic Quebec, 15; making a total of 196.

An additional 40 three-bedroom housing units, allocated for Eskimo accommodation, were under construction as part of a private development in Frobisher Bay. These units will be leased by the Department and rented to Eskimo families.

Administration and operation of the rental program in the Mackenzie District was transferred to the Government of the Northwest Territories on January 1, 1969. Policy and financial control, as well as ownership of the properties, were retained by the Department.

**Plans for 1970**

An allocation of an additional 202 three-bedroom houses has been made for 1970.

The administration and operation of the rental program in the Arctic District will be transferred on April 1, 1970 to the Government of the N.W.T. on the same terms and conditions the transfer of the Mackenzie District took place.

The education phase of the rental program will begin in Arctic Quebec early in 1970. The actual implementation of the program will follow.

**DEPARTMENT OF INDIAN AFFAIRS  
AND NORTHERN DEVELOPMENT**

**COMMUNITY AFFAIRS BRANCH**

**Responsibilities**

*Social Services Division.* To provide advice and technical assistance, upon request, on welfare matters to the Commissioners of the Northwest Territories and the Yukon Territory.

To advise the Territorial Relations Branch on welfare matters in the Northwest Territories and Yukon Territory.

**Long-Term Plans**

Long-term plans are to continue to provide advice upon request.

**Review of 1969 Operations**

During 1969 responsibilities for the administration of welfare services to all residents of the Mackenzie District of the Northwest Territories were transferred to the Government of the Northwest Territories.

**Plans for 1970**

During 1970 responsibility for administration of welfare services in the Arctic District of the Northwest Territories will be transferred to the Government of the Northwest Territories.

**Responsibilities**

Leadership training of native peoples; or of staff and native peoples together.

**Training Division**

**Long Term Plans**

Have native peoples operate their own training programs.

**Review of 1969 Operations**

Human Resources Development Programs, Ottawa and consulting services on leadership training to regions.

**North of '60**

Consultant services to Community Development Program in the Yukon Territory and Northwest Territories

**Plans for 1970**

Train native peoples to become trainers for community development, sensitivity and other leadership training programs.

Decentralize Training Programs to Regions as quickly as adequately trained people become available to operate these programs.

## DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### INDIAN-ESKIMO ECONOMIC DEVELOPMENT BRANCH

#### Responsibilities:

In the Northwest Territories. Limited industrial development and business services functions on the request of the Northwest Territories Government.

In the Yukon Territory. Provision and application of all Economic Development programs for Indian people.

#### Long-Term Plans

In the Northwest Territories all remaining industrial development responsibilities have been transferred to the Territorial Government. Indian people resident in the Territories are eligible to receive assistance through the Indian Economic Development Fund.

The Yukon Territory forms part of the British Columbia and Yukon Administrative Région. It is proposed to continue resource and industrial development and business services programs for Indian residents; to encourage the participation of the Indian people in the expansion and development of their human resources and to stimulate development of economic independence of the Indian people.

### Review of 1969 Operations

#### Northwest Territories

Administration of industrial and business services programs in the Mackenzie District was transferred to the Government of the Northwest Territories effective April 1, 1969 and in the Arctic District effective January 1, 1970.

In the Mackenzie District the Branch reviewed reports received from the Government of the Northwest Territories. In the Arctic District management services were provided to the duffle factory at Baker Lake and the cannery at Rankin Inlet, resulting in improvements in methods and increased production. Two new industries were encouraged to establish in the Baffin region — a knitwear operation at Frobisher Bay and a pilot weaving project at Pangnirtung. While management services were provided for these projects by the Branch, local administration was the responsibility of the Administrator of the Arctic.

Field services related to administration of the Eskimo Loan Fund were provided by Territorial Government staff in the Mackenzie District and by the Administrator of the Arctic in the Arctic District.

An Eskimo was assisted with the purchase of a 40 foot longliner through the Eskimo Small Boats Assistance Program.

The Branch continued to co-ordinate operations of credit unions in the Northwest Territories and co-operatives in the Arctic District. A complete audit of credit unions was carried out late in 1969, with satisfying results.

## **Yukon Territory**

Fishing — the salmon catch for sale by Indians amounted to 95,000 pounds; the trout and whitefish catch 80,000 pounds. In addition 1,000 pounds of salmon eggs were harvested. The value of the total catch was \$70,000.

Tourist Outfitting — Indians working as guides for hunting and fishing earned an estimated \$50,000. One Indian businessman operated his own big game hunting outfitting business in the Yukon.

Handicrafts — gross sales from the handicraft retail outlet were approximately \$85,000, which provided an income of \$65,000 to 225 Indian handicraft producers. Private handicraft sales by Indians to lodges, souvenir shops, individuals, etc. provided an estimated additional \$50,000 income.

Mining — a considerable number of Indians were employed by mining companies in staking, line cutting, soil sampling and production activities.

Trapping — the Branch continued the trapper education program designed to improve the yield and quality of fur taken by Indian trappers. Employment opportunities offered by mining companies reduced participation in trapping and the total volume and value of fur taken.

### **Plans for 1970**

## **Northwest Territories**

To provide funds for resource development projects to be administered by Territorial Government staff. To provide financial assistance through the Indian Economic Development Fund to Indian residents for business enterprises.

## **Yukon Territory**

Fishing — Fishing nets will be supplied at cost to Indian fishermen. Salmon-egg harvesting will be expanded to include participation by the people of Old Crow.

Trapping — The program of trapper education by a specialist will be discontinued. Traps will be supplied at cost to Indian trappers, with additional technical assistance from Agency staff in the proper preparation and most effective marketing of furs.

Tourist Outfitting — Total re-organization is expected to result in an increase in the gross income of the existing Indian Outfitting operation. Iskut Lake Indians have been granted a guiding area. Development assistance will be directed to that area, to the greatest extent possible, so that a full season of bookings can be expected for 1971. The Department will also establish additional fishing guides in the Kluane and Iskut Lake areas.

Handicrafts — An increase in the production and sale of all types of handicraft is expected. Two more retail outlets operated by Indians have been established.

Logging and Sawmilling — Ross River Sawmill is expected to produce 1.5 million feet, Board Measure, of lumber in 1970, providing employment for fifteen men and generating about \$75,000 in wages.

Mining — Geological training courses will continue. Prospecting by Indians is expected to increase with more financial benefit to the individual for his efforts. Training courses offer instruction to Indians in procedures for the proper registration of claims, and the methods generally employed in securing further assessment of properties by reputable mining companies.

Co-operatives — Further development of the Old Crow Co-operative Association, engaged in general merchandising, is planned.

## DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### INDIAN-ESKIMO ECONOMIC DEVELOPMENT BRANCH

#### YUKON INDIAN AGENCY

##### Responsibilities

The administration of the Indian Act and other federal statutes as they pertain to those people in the Yukon who are registered Indians.

To assist these people in developing and growing so that they may share fully in the social and economic life available to all Canadians. This development is met in specific ways — through programs in the field of education, economic development, social development, community development and human development.

##### Long-Term Plans

To continue the improvement of community facilities for the Indians of the Yukon, so that they may share in such amenities as adequate housing, electrification, water systems, sanitation, street lighting, employment and education.

To work with and develop their ability to use the natural resources which are available in such abundance in the Yukon, such as fur, fish and game, and to use these resources both as food and as a livelihood. (The Branch has greatly encouraged this through the operation of a retail outlet to handle the manufacture and sale of Indian handicraft products.)

#### Review of 1968-69 Operations

##### Education

The field of education in the classroom is, at the present time, handled completely by the Yukon Territorial Government. Enrolment at the Yukon Technical Training School is handled as a joint effort between the Territorial Government, Canada Manpower and the Yukon Indian Agency. One residential school at Carcross was closed in June, 1969 and the entire building turned over to the Territorial Government Education Department. Three classrooms in this building are being used by the Territorial Government Education Department, as part of the Carcross Elementary School, and the remainder of the building is unused. No further progress has been made in having the two hostels in Whitehorse (Coudert and Yukon Hall) turned over to the Yukon Territorial Government.

##### Social Programs

As in other parts of Canada, the eventual handling of all phases of welfare services by the provincial government (or in the case here, the Yukon Territorial Government) is something that we have to work towards. The Yukon Agency is in close liaison with the Territorial Department of Welfare, and the policy and rates laid down by them are closely followed by this office. Child welfare and adult care are also subjects closely followed in cooperation with the Yukon Territorial Welfare Department.

## **Community Planning**

The Yukon Agency continues to enlist the help of other government agencies in planning communities.

The Whitehorse Band Council, in conjunction with the Territorial Engineering Department, laid out the street lighting plan for their village. The lights were installed by Yukon Electric in the locations decided upon by the Band Council and the Territorial Engineering Department.

Further developments in such phases as this, is the installation of a water system this coming summer in Ross River. This is being done in conjunction with the Indians and the Territorial Engineering Department.

## **Housing**

Housing continues to be a problem in the Yukon due to difficulties associated with freight facilities and costs.

Twenty-three houses were built during 1969, of which all but three were wired. The housing program at Old Crow, which was to see the erection of 12 houses, had to be delayed as the logs stockpiled for the construction of the houses had to be used to replace the Territorial school building which was destroyed by fire in April of '69. However, now that the school is nearly finished, the Indians are again stockpiling logs so that the housing program at Old Crow should go forward in the summer of 1970.

A major development in the housing program during the past year was the change from log cabins to fully insulated and properly constructed frame houses, and provisions within the house for a future bathroom, water and sewage facilities.

## **Domestic Water**

During the period under review, a full examination was carried out regarding water on the Whitehorse Indian Reserve. Several meetings were held with the Whitehorse Band Council and Dr. L.M. Black, Zone Director, Northern Health Services. Various plans and ideas were discussed with the Band Council and Dr. Black. The most practical one to fulfill the immediate needs, was the suggestion by Dr. Black (which was accepted by the Band Council), that a 100-gallon plastic tank be put in each house rather than the one large tank in the village. The village tank was either drained by children, or frozen because somebody forgot to light the fire. This temporary measure has met with mixed reaction from the Indians. The majority of comments have been favourable, as it means that they no longer have to pack water half a mile in 40° below zero temperature.

A well and pump-house, with a submersible pump, are under construction at the present time at Carmacks and should be operational within the next month, which will provide the people of Carmacks village with a safe and sure supply of water.

## **Sanitation**

During the past year, a wash-house for the use of the Indian people was constructed at Burwash. This will provide the people of this settlement with hot water, proper washing facilities and drying facilities. Should it be successful, further planning for the installation of such wash-house facilities in other villages will be initiated.

## **Electrification**

All Indian settlements have electricity available except those in the extreme isolated areas of northern British Columbia.

The village of Old Crow is completely wired and all new houses are wired at the time of construction. Unfortunately, a few of the people, although they reside in houses which are wired, have not yet been supplied with electricity. We have discussed this with them and, in cases where lack of funds is a factor, we have assisted where possible.

## **Community Halls**

Both the community hall at Whitehorse and the one at Upper Liard function as recreational-educational centres for Indian children. Both halls have kindergartens. Also, the hall at Whitehorse is used for an adult education program in the evening, and movies are shown once a week in both halls.

## **Economic Development**

The Branch continues to participate in all phases of resource utilization.

During the forthcoming fiscal year, there will be further development in commercial salmon fishing at both Dawson City and Pelly River. Winter commercial fishing at the various lakes in the Yukon has also been encouraged by the provision of low-cost nets and equipment.

Trapping continues to be the main source of income for those Indians who retain more of the native way of life. Fur prices continue to hold up, and to assist the Indians, the Branch sponsored a visit by Mr. L. Hanson (Trapper Education Instructor), of Kamloops, B.C., who visited several Indian communities to improve their trapping and preparation of furs for market, so as to ensure a better price for their furs.

The big game outfitting, under the guidance of Frank Sidney and the Project Officer, had a successful year, considering the extremely wet weather experienced in August, September and October, which placed all Big Game Hunting areas at a great disadvantage, of which Frank Sidney's was no exception.

The increased mining activity in the Carmacks-Beaver Creek area, where a record number of claims was staked, has provided a great deal of employment for the Indians. Six Indians were successful in obtaining funds from the Prospector's Assistance Program. Although all the results are, as yet unknown, one particular claim, several development firms interested in.

The reactivating of the coal mine at Carmacks, and the opening of the Anvil Mines at Faro, have also provided employment for Indians. At the end of November, 1969, the labour force at Anvil Mines was approximately 10 per cent Indian.

Handicraft production and sales continue to increase. Sales at the end of 1968 totalled \$81,000. The figures for 1969 are not yet available, but the project manageress indicated that she expected 1969 sales to be higher than in 1968, with,

hopefully, a further increase in 1970, as the product becomes better known and the quality of the workmanship increases.

The operation of the sawmill at Ross River continues to be rather sporadic, although it is now in operation. A great loss was suffered last summer due to the fire season destroying a good portion of standing timber. However, good use was made of the mill equipment which was rented out to clear the townsite of Faro, which had been destroyed by fire in June 1968. Although it is rather a negative point, insofar as economic development is concerned, the employment of Indians during the fire season in the Yukon Territory is a factor, although they could certainly do without fire seasons such as the Yukon Territory experienced during May and June 1969.

#### **Plans for 1970**

Present planning calls for:

A continuation of the house building program;

Enlargement of the Old Crow Co-operative, which began operation on January 1, 1970;

Continuation of the present close liaison and cooperation with the Department of Social Welfare in all phases of their program;

Development of further skills in handicraft manufacture, fishing, hunting and fur marketing; and

A continuing effort in the field of education, building up the educational standards and employment opportunities of the Indians

## DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### NATIONAL AND HISTORIC PARKS BRANCH

#### NATIONAL HISTORIC SITES SERVICE

##### Responsibilities

During the past three years, the National Historic Sites Service has carried out a thorough review of persons, places and events in Yukon territorial history. A number of items have been identified as being of national historic importance. They will be commemorated by the Federal Government with assistance from the Yukon Territorial Government where advisable.

##### Long-Term Plans

To assist territorial governments in their historical marking program. To implement, after acceptance by the Minister of the Department of Indian Affairs and Northern Development, and according to priorities, all recommendations by the Historic Sites and Monuments Board.

A historic sites program was recently announced for the Yukon Territory with three main interpretive themes.

The first is to interpret the Chilkoot and White Pass Trails travelled by the gold seekers from Dyea and Skagway to Bennett, Yukon. This is to be undertaken with the United States through the development of a park to be known as the Klondike Gold Rush International Historic Park.

The second theme will be the wintering at Bennett, stabilization of the old Presbyterian Church there and the development of an interpretive centre. The last theme involves water transportation to the gold fields and the coming of the railroads. Plans include restoration of the S.S. *Klondike* over a five-year period at an estimated cost of \$238,000.

Included in the over-all restoration picture will be the acquisition and restoration of some 14 buildings at Dawson City and the acquisition of a gold dredge and property at Bonanza Creek, scene of the first strike. Total development costs are estimated at \$2,000,000 and the work is scheduled over an eight-year period.

##### Review of the 1969 Operations

Maintenance of the Palace Grand Theatre and the S.S. *Klondike* was continued. Work continued on the restoration of the S.S. *Klondike*. Land acquisition for the Yukon restoration program began.

##### Plans for 1970

Members of the Historic Sites and Monuments Board will attend the unveiling of two commemorative plaques at Fort Smith and Fort Simpson on June 12-13 respectively. Restoration will continue on the S.S. *Klondike* and land acquisition for the Yukon historic sites program will continue.

## DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### WOOD BUFFALO NATIONAL PARK

#### Responsibilities

The Branch operates Wood Buffalo National Park in Northern Alberta and the Northwest Territories. This entails provision of services for visitors, protection of natural resources and supervision of permitted resource uses.

#### Long-Term Plans

Long-term plans envisage a survey of Park values and potential visitation to determine priorities for development. No major developments are proposed before the results of this study are known. The study will indicate the best uses of the Park, within the scope of National Parks Policy, and the types of development required to permit these uses.

The scope of the buffalo management program will be increased in future years. The enlarged program had been planned to begin in 1969-70, but engineering studies and revised estimates for renovation and repair of abattoir and corrals were not completed in time. In order to remain within budget limits, the work is now planned for 1973.

#### Review of 1969 Operations

The capital budget for 1969-70 was \$293,000. Of this, \$185,000 of work for the buffalo management program was deferred pending engineering studies and revised estimates. No major construction was carried out; funds expended were devoted to replacement of obsolete equipment and minor facilities.

The Operations and Maintenance expenditure for the year was \$494,000. The expenditures were allocated as follows (amounts include applicable salary and wages costs):

Roads Maintenance	\$ 63,000
Building and Equipment Maintenance	72,700
Resource Conservation	280,000
Administration and General	73,000
Visitor Service	5,300

In addition, an unbudgeted amount of \$393,000 was spent in fire suppression. The Park had 42 known forest fires in the summer of 1969, compared to a total of 55 recorded fires for the ten-year period 1959-1968.

The buffalo management program, under Resource Conservation, involved two roundups in February and June for anthrax vaccination. A total of 2,000 animals were treated. Regular aerial surveys were carried out during the summer; no evidence of disease outbreak was seen.

Outside of forest protection and buffalo management, operations of the Park were directed to: upgrading the physical establishment; staff development; increasing knowledge of the Park; and supervision of resource extraction activities – hunting, trapping and timber berths. A photo-interpretation study of potential gravel sources was made for future road maintenance needs.

#### **Plans for 1970**

No new developments or activities are planned for 1970. It is intended to give increased emphasis to resource protection, study and resource survey of the Park and supervision of resource-based operations.

## DEPT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### NORTHERN ECONOMIC DEVELOPMENT BRANCH

#### Responsibilities

The Northern Economic Development Branch is responsible, on behalf of the Minister and the Federal Government, for the effective management of oil and gas, mineral, water, forests and land resources and for developing the economy of the Yukon Territory and Northwest Territories. Its tasks are to seek out and identify all means whereby the economy of the North can be expanded at a more rapid pace, to develop a broad plan of economic progress, and to recommend, and in some instances manage, specific projects and policies for achieving this objective.

#### Review of 1969 Operations

##### Oil and Gas

Oil and gas expenditures in the Yukon Territory and Northwest Territories exceeded \$70 million in 1969. This is an increase of \$15 million over the previous year. Most of the exploration was carried out in the Delta area of the Territories, on the Liard Plateau in the Yukon Territory and in the Arctic Islands, specifically on Melville Island.

Revenues received by the Federal Government for 1969 were approximately the same as those received in 1968.

Table 1 — Revenues Received, 1969

Yukon Territory	Revenues (dollars)
Permit Fees	8,500.00
Transfer Fees	Nil
Lease Fees	Nil
Rentals	30,749.50
Forfeiture	Nil
Bonus	671,306.75
Total	710,556.25
Northwest Territories	Revenues (dollars)
Licence Fees	1,975.00
Permit Fees	320,450.00
Transfer Fees	45,140.00
Lease Fees	1,290.00
Rentals	1,404,600.82
Royalties	19,630.00
Forfeiture	19,852.44
Bonus	3,043,711.52
Miscellaneous	1,521.18
Total	4,858,170.96

Surface geological and photogeological surveys by the oil industry (measured in geological crew months) doubled over the previous year. Most of this can be attributed to the participation surveys initiated by V. Zay Smith and Associates on the mainland of the Yukon and Northwest Territories; by J.C. Sproule and Associates on the Arctic Islands; and by Pallister and Associates in carrying out their Arcticquest and Polarquest programs in the Arctic Archipelago.

A conglomerate of consulting firms in Calgary organized "Operation Geoquest" in 1968. The project involved assorted mapping programs in the Northwest Territories south of latitude 65°. Basic information was collected by surface geologic surveys, gravity and magnetometer surveys and structure test drilling. Landholders participating in this project could allocate expenditures to permits in the Northwest Territories and Yukon Territory.

A second and more extensive project "Operation Arcticquest" was organized by the same conglomerate of consultants. The geophysical programs were carried out along the Arctic Coastal Plain and in the offshore to about the 200 meter depth contour. Surface geologic work was concentrated in Northern Yukon. Participants in "Operation Arcticquest" can allocate expenditures to permits approximately one hundred miles on either side of the Yukon and N.W.T. mainland coastline.

A third project "Operation Polarquest" also organized by the same group of consultants included experts in other technical fields. "Operation Polarquest" will cover some 350,000 square miles surrounding the Arctic Islands. With the effort focused on the offshore areas, it will complement the adjacent on-land exploration programs of Panarctic Oils, King Resources, Elf Oil and others on the Arctic Islands. Companies subscribed to 25 programs representing expenditures of about \$3.5 million for the first year of a four-year program. Programs approved included field geologic work; compilation of previous geologic, seismic and other work; a bathymetric program; environmental studies, an aeromagnetic program; a gravity program; and the first phase of feasibility studies on Arctic offshore drilling under various types of ice conditions. Seventeen contractors will be involved in "Operation Polarquest".

Seismic operations in 1969 increased by more than 100 per cent over the previous year. A total of 160 seismic crew months were recorded including marine offshore and marine Mackenzie River programs. The magnitude of activities in this type of exploration indicate an increased level of drilling in the future since it usually takes one to two seasons of seismic explorations to locate suitable drilling sites. The exploration activity indicates a constant increase in seismic activities since 1966 and doubling of seismic operations in 1969. Indication for 1970 is that activity will be maintained at the level achieved in 1969.

Oil companies undertook much of their seismic activity in the southern portion of both parts of the territories south of Fort Simpson on the Peel Plateau. Imperial Oil Enterprises, however, continued to carry out large reflection seismic programs in the Delta and Tuktoyaktuk area. Marine seismic programs in 1969 were restricted to near-shore areas because of refreezing ice conditions in the Beaufort Sea.

A large gas discovery in 1966, in the Pointed Mountain area of Fort Liard, was followed up by a third successful gas well in 1969. Preliminary indications are that

the reservoir has good porosity, permeability and productivity. A fourth well was commenced during the year but severe subsurface and mechanical problems were encountered and work had to be suspended. Current plans are to skid the rig and drill a new well in the same target area.

Drilling activity has increased considerably in the past three years in the southern Northwest Territories. This, in part, can be attributed to fewer suitable exploration areas in the provinces; to the interest generated by the Alaska discoveries; and to the start of construction of year-round road systems in the territories so that the price of exploration will be considerably reduced, as this measure will make it possible to move equipment and supplies by means of conventional methods during 12 months of the year.

Two wells were drilled in the Delta Area by Imperial Oil and partners. Both achieved their stratigraphic objectives, but as no commercial indications of oil and gas were found the wells were abandoned. The third current well, Imperial Atkinson H-25 recovered oil. Imperial Oil in its press release stated that medium gravity, sweet oil flowed to the surface from the 5,700 foot level. Imperial now plans to fly a second rig into the area to begin offset drilling.

Oil exploration in the Yukon in 1969 consisted of several restricted marine seismic programs off the Arctic Coast; and the drilling of an extension test in Beaver River. Ice conditions on the Arctic Coast last year precluded carrying out extensive marine seismic surveys; only protected areas such as channels and ice-free bays were surveyed. Work is to continue on a larger scale in 1970.

In the Liard area, Pan-American Petroleum Corporation drilled Beaver River, Y.T. G-01 as a gas well and thereby extended the Beaver River gas field into the Yukon Territory. The well is currently undergoing production testing and will be put into production as soon as pipeline facilities become available.

“Wells Drilled” and “Seismic Crew Months” will increase or maintain the same level during 1970. If ice indications are favourable in the Beaufort Sea, large marine seismic programs will then increase seismic exploration substantially during the current year. The continuation of Panarctic drilling program; the proposed wildcat drilling in the Delta area; the Arctic Island drilling program by King Resources, Elf Oil and Triad-BP will increase the number of wells drilled to at least 65 in 1970. Because drilling activities will increase substantially in the Arctic Islands and Delta areas, total exploration expenditures may reach \$75 million in 1970.

Table 2 – Number of Permits and Leases and Relevant  
Acreage – December 31, 1969

Permit	No. of Tracts	Acreage
N.W.T. Mainland	2,425	112,272,315
Y.T. Mainland	675	29,413,623
Arctic Islands <sup>1</sup>	5,211	258,045,966
Arctic Coast Marine <sup>2</sup>	839	38,896,436
Total Permits	9,150	438,628,340

## Lease

N.W.T. Mainland	412	2,675,335
Y.T. Mainland	55	186,092
Arctic Islands <sup>1</sup>	—	—
Arctic Coast Marine <sup>2</sup>	—	—
Total Leases	467	2,861,427

<sup>1</sup> All areas North of 70°, onshore and offshore.

<sup>2</sup> All areas South of 70°, covered by seacoast waters.

## Panarctic Oils Ltd.

Panarctic Oils Ltd. is now in its third year of operation. The Company oil and gas permits now total 51.1 million acres in the Arctic Islands. During 1969, Panarctic showed a rapid growth in maturity as an operating entity and has been able to secure commitments from industry for nine wells on low priority holdings, thus securing for itself greater freedom to meet its high priority commitments on favourably located prospects.

The initial field exploration commenced March, 1968 and continued in 1969. Surface geological surveys were continued on most of the central Arctic Islands. The six month geophysical program was completed successfully by tracked vehicles assisted by helicopters. Base camps with airstrips were set up at Winter Harbour, Marie Bay, Sherard Bay and Rea Point, all on Melville Island. Stock-piles of field and drilling supplies were established at Resolute Bay, Sherard Bay and Rea Point. During the year, a total of 788 miles of seismic surveys were carried out. This includes 708 miles of reflection shooting and 80 miles of refraction shooting. Work was carried out on the following islands: Loughheed, Edmund Walker, Ellef Ringnes, Amund Ringnes, Cornwall, King Christian, Melville (Sabine), Ellesmere (Fosheim).

The drilling phase of the program commenced in April 1969 when two drilling rigs were flown to Melville Island by Hercules aircraft. Panarctic Drake Point L-67 was spudded on April 9, 1969. After encountering severe gas blow-out problems, the well finally blew out of control at a depth of 8,595 feet. The well was blowing out of control at the end of the year, but a relief well was being drilled to control it from a location 1,200 feet away.

## Land-Use Regulations

During 1969 the Department commenced preparation of Land-Use Regulations designed to minimize damage to the fragile northern land environment in the course of resource exploration and development.

The proposed Regulations will require exploration companies who wish to carry out a land-use operation north of 60 to apply for a permit and follow specific rules related to methods and timing of the operation.

The Department held a number of consultation meetings with the petroleum and mining industries to ensure the Regulations would be workable, and with

conservationists to ensure that adequate environmental protection measures were built in.

### **Mackenzie Valley Pipelines**

One of the major markets for Prudhoe Bay oil is the north-central United States. Oil operators in Alaska and Northern Canada realize that the most direct route from Prudhoe Bay and Delta area to the United States mid-west area is along the Mackenzie Valley, and that a pipeline built along this route would provide transportation for a vast but as yet undiscovered oil reserve in northern Canada. Accordingly, a consortium of four oil exploration companies and two oil pipeline companies were formed to determine the technologic and economic feasibility of constructing a 48" diameter crude oil pipeline from the north slope of Alaska, up the Mackenzie Valley and on to Edmonton where it would connect with existing oil pipelines.

A parallel gas pipeline would follow the same route but divide in the vicinity of Fort Simpson, one section proceeding to Fort Nelson to tie in with Westcoast Transmission Pipeline, the other segment to proceed to central Alberta to tie into existing pipeline facilities for gas transmission to central areas of the United States and Canada.

The major part of the research was contracted to Canadian Bechtel Limited. Since the announcement of the research project on July 14, 1969, other oil exploration companies making a total of eleven, and two gas pipeline transmission companies have joined the project.

### **Mining – Yukon Territory**

The year 1969 saw a continuation of expansion of the mining industry that commenced in 1964 with the completion of the Great Slave Lake Railway.

In the Northwest Territories, one new mine came into production at a designed rate of 300 tons of ore per day. However, a gold mine also was shut down during the year. Production increased in that tons of ore processed increased from 10,820 tons per day at the beginning of 1969 to 12,039 tons per day at the end of the year.

In the Yukon one large tonnage lead-zinc mine came into production. However, two small gold producers were shut down during the year. Production increased in that tons of ore processed increased from 4,444 tons per day at the beginning of the year to 10,325 tons per day at the end of the year. It is anticipated there will be an increase in milling rate in 1970 since one mine is planning a 20 per cent increase in production. Total mineral claims recorded in the two territories amounted to 35,341 claims, which is a decrease of 17,551 claims over that of 1968. However, 103 prospecting permits were granted covering 18,500,000 acres of land which is equivalent to the area of approximately 360,000 claims.

Exploration in the Yukon during 1969 shifted to the Casino-Canadian Creeks area northwest of Carmacks on a large low grade copper-molybdenum deposit. By the year end some 10,000 claims were staked and recorded in this area. Exploration and development did continue in other areas mainly on copper and nickel occurrences in view of the rising prices of both these metals.

*United Keno Hill Mines Ltd.* continued production at 150 tons of ore per day with mill heads averaging 38.6 ounces of silver per ton, 7.5 per cent lead and 6.5 per cent zinc. Stope preparation work continued on the Husky vein on Galena Hill. Rehabilitation of the Sadre-Ladue property on Keno Hill continued.

*New Imperial Mines Ltd.* continued production at a milling rate of 2,000 tons per day with mill heads averaging 1.15 per cent copper from its open pit operations. A decision has been made to mine the downward extension of the Little Chief orebody and a decline shaft was commenced in November. The Company produced nearly 16,000,000 pounds of copper during the year.

*Arctic Gold and Silver Mines Ltd.*, which came into production in September, 1968 as a small gold-silver producer was closed in 1969 due to difficult metallurgical problems.

*Mount Nansen Mines Ltd.*, which came into production as a small gold-silver mine in September 1968, was also closed in 1969 due to metallurgical problems. Underground development work continued, however, with a view to resuming production in the future when metallurgical problems are resolved.

*Cassiar Asbestos*, located on Clinton Creek 50 miles northwest of Dawson, has exceeded its designed milling rate of 80,000 tons of fibre per year. Production in 1969 was 88,000 tons, and is expected to approach 100,000 tons during 1970 without any major changes in the mill circuit.

*Venus Mines Ltd.*, located on Windy Arm of Tagish Lake near Carcross, continued with underground exploratory and development work during 1969. The Company has announced production plans with a mill having a designed milling capacity of 300 tons per day. The mill site has been levelled off and construction of mill building is to commence immediately. Reported ore reserves are 138,400 tons grading 0.39 ounces of gold and 11.6 ounces of silver per ton.

*Anvil Mining Corporation Ltd.*, located 130 air miles northwest of Whitehorse, came into production in October, 1969. The mill capacity (designed) is 5,500 tons per day capable of producing 370,000 tons of selective lead and zinc concentrates annually. By year end the mill had not yet reached its full designed capacity.

The first shipment of 18,000 tons of concentrates left the seaport of Skagway, Alaska for Japan on December 8, 1969. The Company has announced a \$3.5 million expansion program to increase milling capacity to 6,000 tons per day and to produce 470,000 tons of concentrates each year. The additional 90,000 tons of concentrates will be sold to a West German firm.

*Hart River Mines Ltd.*, located 40 miles east of mile post 52 on the Dempster Highway northeast of Dawson, continued underground exploratory work on copper-lead-zinc-gold-silver occurrences. Two adits were driven, one at the 3,850 foot elevation for 646 feet, and the second at the 3,080 foot elevation for 218 feet. Some 3,000 feet of surface diamond drilling and 5,000 feet of underground diamond drilling has been completed, outlining some 600,000 tons of ore grading 1.45 ounces of silver, 0.041 ounces of gold per ton, 1.45 per cent copper, 0.87 per cent lead and 3.65 per cent zinc.

Contracts are being negotiated and feasibility studies have been undertaken.

*Hudson Bay Mining and Exploration Ltd.*, continued drilling on its lead-zinc property at McMillan Pass on the Canol Road. An adit was collared late in the year. Earlier work (1952) outlined 9,000,000 tons of ore containing five to six per cent zinc and 0.8 per cent lead.

The Company de-iced its underground working on its Quill Creek nickel-copper property. Serious negotiations are in progress to obtain a market for nickel-copper concentrates.

#### Mining — Northwest Territories

There were 19,083 mineral claims recorded in the Northwest Territories in 1969, a drop of 25,406 from that in 1968; however, in addition, 103 prospecting permits were granted covering 18,500,000 acres of mining land. Exploration activity shifted to the Arctic and Hudson Bay Mining District, inland from Hudson Bay and in the Arctic Islands. This activity is expected to continue into 1970.

Considerable interest was shown on the silver occurrences in the Great Bear Lake area, and on copper deposits in the Coppermine River area, on the nickel occurrences in the Artillery Lake-Dubawnt Lake area, and on copper deposits in the Coppermine River area and in the East Arm of Great Slave Lake.

*Pine Point Mines Ltd.* operated at a milling rate of nearly 10,000 tons per day, although the grade of ore mined dropped considerably since the mining of highgrade direct-shipping ore ceased in 1968. The value of mineral production was maintained in view of the higher milling rate and an increase in the world price of both lead and zinc.

The Company has announced that underground development work will commence on one deep orebody in 1970.

Gold production from the gold mines in the vicinity of Yellowknife dropped to \$12,935,473 in 1969 from \$13,285,459 in 1968 due mainly to the closure of one gold mine early in the year.

*Con-Rycon-Vol-Yellorex* had its lowest production since 1964 when mining and milling was curtailed for two and a half months as a result of a fire that destroyed the hoistroom. Plans are in progress at year end to increase milling capacity by 15 per cent. This Company is currently engaged on a large underground expansion program. A shaft is being sunk from the 4,900 foot to the 5,500 foot level and an additional 500 feet below this level is now being considered. Cominco and Yellorex have entered into an agreement whereby the Con Mine will develop and mine the Yellorex orebody.

*Giant Yellowknife Mines.* Tonnage milled was up five per cent over 1968 and gold production was increased by nine per cent. Milling rate at Giant is 1,000 tons per day with approximately 800 tons from the Giant workings and the remainder from Supercrest and Lolor Mines.

*Terra Mines and Exploration Co. Ltd.* brought its silver-bismuth property into production in September, 1969. The mill was operating on a trial basis to the end of the year. It is reported that 300 tons of silver-bismuth concentrates have been produced and stockpiled at the mine and are waiting shipment over the winter road.

*Canada Tungsten Mining Corporation Ltd.* has improved its recovery of tungsten and copper by the addition of a regrind unit in the mill. These modifications have made it possible to maintain tungsten recovery at 80 per cent with mill feed as low as 1.4 per cent. This will extend the indicated life of the mine since the cut-off grade of ore to the mill has been lowered.

The following table shows preliminary production figures for 1969 and comparative figures for 1968 for the Yukon Territory and Northwest Territories. The forecast for the value of mineral production in 1970 from both territories is estimated at \$180 million.

Table 3 — Preliminary Production Figures for 1969 and  
Comparative Figures for 1968,  
Yukon Territory and Northwest Territories

	1968 (dollars)	1969 (dollars)
<b>Northwest Territories</b>		
Gold	13,285,459	12,935,473
Ounces	352,306	343,116
Silver	8,677,365	3,911,170
Ounces	3,751,563	2,026,513
Copper	833,169	550,920
Pounds	1,732,160	1,071,200
Lead	33,636,984	31,037,000
Pounds	250,275,180	205,000,000
Zinc	57,504,129	67,012,000
Pounds	407,830,700	440,000,000
Cadmium	774,060	NIL
Pounds	271,600	NIL
Total	114,711,166	115,446,563
		(continued)

	(dollars)	(dollars)
<b>Yukon Territory</b>		
Gold	911,338	991,700
Ounces	24,167	26,305
Silver	4,806,384	5,770,808
Ounces	2,077,987	2,990,056
Lead	970,629	4,663,120
Pounds	7,221,940	30,800,000
Copper	5,097,157	8,084,127
Pounds	10,597,000	15,718,700
Zinc	748,206	5,201,045
Pounds	5,306,429	34,150,000
Cadmium	147,716	243,600
Pounds	51,830	70,000
Asbestos	8,684,125	12,701,400
Tons	63,592	88,000
<b>Total</b>	<b>21,365,555</b>	<b>37,655,800</b>

### Development Analysis

During the year the major task of this Section was the administration of the Northern Roads and Airports Program. Other activities were concerned with carrying out financial and engineering evaluations of resource developments in the Yukon Territory and Northwest Territories where Federal Government assistance has been requested and in administering programs designed to encourage resource development in the north. A proposed revision of the Northern Roads Policy was carried out.

Studies continued during the year on the feasibility of bringing into production a large iron mining project on Baffin Island. Consultants were engaged to examine in further detail the financial, marketing and transportation aspects of the project.

Following are descriptions of the various incentive programs and the amounts of the financial assistance awarded under the regulations of the Northern Mineral Exploration Program for the year 1969.

*The Northern Roads Program* is a 10-year, \$100 million program designed to provide roads which connect centres of population, lateral roads through areas of favourable resource potential and roads to specific resource development projects. During the year, approximately \$9.5 million was spent on roads in the Yukon Territory and Northwest Territories. In addition, under the Tote Trail Program, which is administered by the territorial governments, approximately \$65,523 has been provided for assistance in the construction of low-standard roads to resource projects.

The following list shows expenditures on specific road construction projects during the year:

	(dollars)
Campbell Highway	1.160 million
Dempster Highway	0.556 million
Canol Road	0.272 million
Dawson-Boundary Road	0.056 million
Mackenzie Highway	3.224 million
Yellowknife Roads	0.185 million
Fort Smith Highway	0.391 million
Fort Resolution Road	0.045 million
Contributions to Access Roads	0.990 million
Surveys	0.613 million
Reconstruction of Existing Roads	1.949 million
Miscellaneous Projects	0.159 million
	9.600 million

*The Northern Resource Airports Program* provides financial assistance on a cost-sharing basis for the construction of airports which are intended to provide access to resource exploration and development projects. Departmental commitments for this purpose during the year were approximately \$100,000.

Applications for grants under the *Northern Mineral Exploration Program* were received from 37 companies in respect of 37 individual programs of mineral and oil exploration. Financial assistance and commitments of assistance amount to \$0.88 million for the year to assist 37 approved programs. An additional \$4 million was provided in the current year for a large oil and gas exploration program in the Arctic Islands.

### Water Resources

During 1969, the Water Resources Section, in conjunction with officials of the Department of Justice, completed preparation of the Northern Inland Waters Act (formerly called Northern Water Rights Act), and passed the final draft Act to Cabinet for introduction to Parliament. The Act will establish a system of water rights licencing north of 60, and contain measures to control water pollution.

The 1969 survey of hydro-electric power resources in the north, conducted by T. Ingledow & Associates Limited of Vancouver, concentrated on the Liard River north of 60 and on the watersheds of the Dubawnt, Kazan, Hanbury and Thelon Rivers. The report, in two volumes, contains a preliminary technical and economic evaluation of the development of a number of potential hydro-electric power sites on these rivers.

The preparation of regulations to control the use of public lands in the North, and thus minimize damage to the natural environment by resource exploration and development operations, commenced in early 1969. Combined with the pollution control aspects of the Northern Inland Waters Act, these Land-Use Regulations will provide the Water Resources Section with a strong capability to protect the northern

land and water resources. Consultations with the petroleum and mining industries, with conservation organizations and with the territorial governments were undertaken in preparing the Regulations during 1969.

To provide reliable, proven data in support of land-use and pollution control programs, the Section initiated in 1969 a program of applied research, called the Arctic Land-Use Research Program. The Universities of Saskatchewan and Laval were contracted to select optimum research locations and develop a research program in line with departmental objectives and priorities.

Finally, the Water Resources Section carried out the Department's responsibility for administering the Dominion Water Power Act and Regulations.

### **Forest Management**

During 1969, timber harvesting agreements were concluded with four forestry firms for operations in the Yukon Territory, each providing for production of up to 10 million f.b.m. per year over a ten-year period. These timber operations are now beginning to come into production and the volume of timber produced in the North is expected to increase substantially.

Forest inventory surveys and forestry feasibility studies were conducted by private forestry consultant firms on three major forested areas in the North. These included the Lower Liard River in the Northwest Territories and the Upper Liard and Teslin Forest Units in the Yukon Territory. On the basis of these surveys, timber harvesting units and allowable cut levels are being established which will provide the basic framework for the allocation of timber cutting rights.

*Timber Production.* Timber production in the Yukon Territory during the 1969 calendar year amounted to 12,500,000 f.b.m. of saw logs, 336,800 lineal feet of round timber and 7,400 cords of fuel wood. The estimated roadside value of the timber produced was \$870,000. Stumpage revenue totalled \$14,566.

In the Northwest Territories, 2,410,000 f.b.m. of saw logs, 304,700 lineal feet and 1,460 cords of fuel wood were produced during the year. Roadside value was estimated at \$278,100 and stumpage revenue totalled \$3,220.

*Forest Protection.* In 1969, the Yukon Territory experienced one of the worst forest fire seasons on record. In the protected zone alone (an area of 56,400 square miles), 111 fires resulted in a loss of 910,000 acres. In the non-protected zone, a further 26 fires burned approximately 319,000 acres.

In the Mackenzie District of the Northwest Territories, 139 fires in the protected zone (an area of 98,600 square miles) and 44 fires in the non-protected zone burned a total of approximately 1,300,000 acres. About 90 per cent of the area burned was in the Lower Mackenzie River region.

*Campsites and Picnic Grounds.* The Department continued to contribute towards the campsite programs in both Territories in 1969, with the two Forest Services carrying out maintenance and development work. Forty-two campsites were operated in the Yukon and 17 in the Mackenzie District.

## **Canada Lands**

In 1969, the revenue derived from the lease, sale or other disposal of lands in southern Canada and the Yukon and Northwest Territories increased to approximately \$400,000.

More than 230 parcels of land were transferred to the administration of the Yukon Territory and Northwest Territories to provide a source of revenue for the territorial governments and to expedite community development.

Altogether, 75 reservations were established in the Yukon Territory and Northwest Territories to accommodate installations of other federal departments engaged in the supply of essential services for northern residents and 30 obsolescent reservations were cancelled in order to permit alternate, beneficial use of the lands for public purposes.

In southern Canada, title research was carried out to ratify departmental ownership of 52 properties and they are now being utilized productively.

Forty-five properties of considerable value were acquired by transfer from other federal departments and 11 comparable parcels, valued in excess of \$2 million, were made available to agencies at the various levels of government and to educational and religious organizations, without financial compensation.

In excess of 60,000 documents and records covering grants of former Dominion Lands in western Canada were indexed, catalogued and microfilmed with the result that photocopies of such material as Letters Patent, Métis Scrip, Military Bounty Warrants, South African Veterans' Land Claims, Hudson's Bay Company Notifications and Royal Canadian Mounted Police Land Warrants may be produced.

Forty-two abstracts of title relating to land settlement were compiled for historical research projects, 61 certified true copies of documents were made available for the same purpose and thousands of general enquiries on land matters were answered.

## **Economic Staff Group**

The Economic Staff Group is one of four Divisions which comprise the Northern Economic Development Branch. The Group functions to provide advice on the northern economy to senior departmental management and to undertake studies on matters which relate to the economic development of the North.

The undertaking of major studies in various fields is a continuous function of the Group. Some of these studies are conducted entirely within the Group, while others, due to the limitations of staff strength, are undertaken by private consultants.

Functionally, the Group is divided into two Sections. A Resources and Transportation Section is concerned with the general field of northern mineral and other resource development, and undertakes studies in the transportation field. As well, the Section is responsible for developing and preparing policies and programs which provide for the development of adequate transportation facilities in the North. A Planning and Manpower Section is responsible for work in the general area of providing a Northern Development Strategy, for research into the economic

characteristics and potential of economic regions and sub-regions, and for research into areas of study relating to demographic and labour force matters in connection with the employment of northern residents and the development of northern industry.

During 1969, the Economic Staff Group conducted a number of studies on a variety of subjects, as well as initiating several projects which were undertaken by private consultants on behalf of the Department. However, the evolution of a strategy for the development of the Yukon Territory and Northwest Territories was accorded top priority in the Group's work-program for the year.

The field phase of a manpower survey of the Keewatin Region was conducted by the Group in January 1969. From the results of the survey, a set of individual data records was produced for every Eskimo surveyed, and the information was made available to federal and territorial officials who are concerned with selection and placement for training and employment. A set of detailed statistical tabulations was also produced from the survey and formed the basis of several studies undertaken in connection with the Northern Development Strategy.

Considerable emphasis was placed on studies aimed at investigating the transportation problems that are likely to be encountered in the Arctic and along the Arctic coast and the possible technological solutions to these problems were investigated. The Group also contributed a considerable input in a major study of a number of alternative railway routes which could perhaps connect the Yukon and Northern British Columbia to the continental rail system and tidewater ports such as Prince Rupert, B.C. The Group played an important role on the Steering Committee which was chaired by the Department of Transport.

Other projects involved research to develop a simulation model of the Yukon Territory economy for purposes of bringing out structural trends in the various sectors of the economy, and of discovering how these structural trends could be changed to realize accelerated rates of economic growth. A consultant was also contracted to develop an appropriate model for evaluating the benefits and costs of alternative strategies in the different regions of the Yukon Territory and Northwest Territories.

In the context of increased oil exploration activities in the northern territories, a study of the economic impact of the oil industry of Kuwait was undertaken, and, on behalf of the Group, a consultant conducted a study of social adaptation in the Central Yukon mining districts. Research was also conducted to establish a social accounting system that will organize and present the kind of economic information which is required for regional planning in the Yukon Territory and Northwest Territories.

During 1969, a consultant was engaged by the Group to up-date existing studies of the economic feasibility of the development of the Mary River iron ore property of Baffinland Iron Mines Limited and to appraise the different methods by which the Federal Government could participate in the exploitation of the Mary River iron ore deposits.

## **Plans for 1970**

### **Oil and Gas**

Drilling activities in the southern portion of the Northwest Territories may decrease over the next year or two due to lack of encouragement in the form of oil and gas discoveries.

Marine seismic surveys in the Beaufort Sea will increase substantially during the current year if ice conditions are favourable. It is expected that three to four large seismic programs will get under way as soon as ice clears from the Mackenzie Bay and Beaufort Sea area.

Imperial Oil will intensify seismic and drilling operations in the Tuktoyaktuk Peninsula to evaluate their oil discovery in Atkinson H-25. Stepout wells will be drilled on at least three sides at varying distances from the discovery well.

The Arctic Islands drilling programs will intensify this year. It is expected that ten wells will be drilled during the current year and another fifteen next year.

### **Mining – Yukon Territory**

Venus Mines Limited will complete construction of a milling plant on its gold-silver property near Carcross. Production is expected to commence in July.

Hudson Bay Mining and Smelting Company Limited plan an underground exploration program on its lead-zinc property near the MacMillan Pass on the Canol Road. This Company is also considering bringing its copper-zinc property near Burwash Landing into production if a market for the concentrates can be obtained.

Brameda Resources Limited, under an agreement with Casino Silver Mines Limited, will carry out further drilling and an underground sampling program on the copper-molybdenum property owned by Casino and located near the headwaters of Casino and Canadian Creeks in the Dawson Range.

New Imperial Mines Limited will continue driving a main incline to enable underground ore reserves to be developed. It is expected that an amendment to the Yukon Placer Mining Act and a new Yukon Minerals Act, replacing the Yukon Quartz Mining Act, will be passed at the 1970 Session of Parliament.

### **Mining – Northwest Territories**

Echo Bay Mines is expected to deepen its underground workings.

Texas Gulf Sulphur Company Inc. will carry out further underground development at its lead-zinc property near Strathcona Sound, Baffin Island.

Cadillac Explorations Limited will continue an underground development program and feasibility studies on its silver-lead-zinc property in the Nahanni District.

Copper Pass Mines Limited and Jason Explorers Limited are expected to mine small tonnages of high-grade nickel ore on properties near the East Arm of Great Slave Lake.

Interest in prospecting permit areas in the Districts of Franklin and Keewatin remains high and drilling programs in search for uranium will be carried out near Baker Lake.

Proposals for a complete revision of the Canada Mining Regulations will be discussed with industry and a revision of the Mining Safety Rules will be completed.

### **Development Analysis**

The proposed revisions to the Northern Roads Policy will be submitted to Cabinet for approval.

The administration of the Northern Roads and Airports Program will continue at approximately the same level of expenditure as in 1969.

The administration of the Northern Mineral Exploration Assistance Program will continue with an anticipated slight increase in the amount of money available for the program.

In all incentive programs greater emphasis will be placed on assistance being conditional on the provision of employment opportunities for northern residents.

### **Water Resources**

During 1970, it is expected that the Northern Inland Waters Act will become law. When this occurs, regulations will be prepared, administrative procedures worked out and additional staff hired to implement the Act and its Regulations in the Yukon Territory and Northwest Territories.

It is also anticipated that the Land-Use Regulations will be implemented during 1970, accompanied by a similar increase in staff for regional administration and on-site inspections.

Finally, 1970 will see the start of field research projects under the Arctic Land-Use Research Program.

### **Forest Management**

Additional forest inventory surveys and growth and yield studies will be conducted in both Territories as part of a continuing program to assess the forest resource potential of the area. There continues to be an unprecedented interest by forest industry firms in establishing timber operations in the North and large scale timber cutting rights will be advertised for two prime timbered areas. It is expected that this will lead to the establishment of permanent forestry operations in both Territories.

Timber disposal policies will be further reviewed and the Territorial Timber Regulations will be revised to provide for long-term timber harvesting rights and proper forest management practices.

Forest-fire protection will be continued, but with greater emphasis being placed on protection of productive forest land.

The Department will continue responsibility for the campsite program in the Yukon Territory, but in the Mackenzie District, the responsibility for campsites will be assumed by the Government of the Northwest Territories.

### **Canada Lands**

Continue to administer resource lands in the Yukon Territory and Northwest Territories, together with the residual interest of the Federal Government in many parcels of public lands in southern Canada, and to assist in measures to stimulate more aggressive agricultural, recreational and commercial development of these areas.

Pursuant to Treasury Board Minute No. 685141 dated January 23, 1969, hundreds of administrative and educational sites in the Northwest Territories, including the appurtenant buildings and service installations, will be transferred to the management and control of the Commissioner to facilitate integrated local government, as part of the transfer of the Development Control Zones to the administration of the Northwest Territories.

The Development Control Zones define the lands within and immediately surrounding the settlements in the Yukon Territory and Northwest Territories which are scheduled to be transferred to the administration of the territorial governments pursuant to the recommendations of the Carrothers Commission, in order to give each of the two Territories greater autonomy through the control of municipal development in concert with the local councils. During 1970, action will be taken to confirm the boundaries of the Development Control Zones for Whitehorse, Dawson, Carcross, Yellowknife, Inuvik, Edzo, Hay River and Fort Simpson, and to effect the transfer of the administration of the lands to the territorial governments. The smaller communities will be dealt with over the next five years in accordance with priorities set by the Commissioners.

Planning in connection with a number of the Eastern Arctic settlements will be completed during the coming year and additions to existing residential and commercial subdivisions throughout the Territories will also be finalized.

It is anticipated that approximately 200 surveys will be carried out on behalf of the federal and territorial governments and the general public to meet the growing demand for residential lands and to accommodate installations necessary to meet the increase in mining and oil exploration activities.

A land title review to determine the number of properties in the Provinces which are still under the administration, management and control of the Northern Economic Development Branch will be continued. Notwithstanding limitations on staff, efforts will be made to complete up to 35 fully documented abstracts of title. The lands so identified will be made available to other federal, provincial or municipal governments for public purposes first, after which efforts will be made to secure optimum revenue from the lease or sale of the remaining lands and buildings.

Negotiations will be carried out for the acquisition of a number of properties in both northern and southern Canada which are essential for departmental purposes by free transfer from other federal departments. Reciprocal arrangements will be made

concurrently to implement transfers of some of our own surplus holdings to agencies which have continuing requirements for the installations concerned.

In accordance with a program started last year, files and records pertaining to resource management on the Northwest Territories and western Canada will be catalogued, indexed and prepared for shipment to field headquarters, land offices and local archives under the new concept of decentralization of responsibilities. Other control records, including reference plans and property registers, will be duplicated or microfilmed for use by officers in the field and the territorial Governments.

Efforts will also be made to accelerate the rate of submissions to the Real Property Inventory of Public Works covering lands, buildings and other improvements held by the various Branches of the Department, in accordance with a recent Treasury Board directive.

### **Economic Staff Group**

The indications are that the conduct of a series of regional economic studies for the northern territories will continue to be accorded top priority in the work-program of the Economic Staff Group during the coming year. These studies will have a direct bearing on the formulation of the Northern Development Strategy.

## DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### NORTHERN ECONOMIC DEVELOPMENT BRANCH

#### NORTHERN SCIENCE RESEARCH GROUP

##### **Responsibilities**

To sponsor and conduct research; to encourage research by non-government agencies; to collect and disseminate scientific information and to operate the Inuvik Research Laboratory.

##### **Long-Term Plans**

To assist in the development of the Canadian North by encouraging scientific investigation; to provide advice and research services to organizations of I.A.N.D. to formulate detailed research programs and to arrange for their implementation.

#### **Review of 1969 Operations**

##### **Northern Research Program**

The Group conducts a continuing program of northern research, mainly but not exclusively in the social sciences, as well as technological problems associated with northern development. Much of this research is undertaken by university scientists and graduate students working under contract or in seasonal employment.

The Mackenzie Delta Research Project, designed to isolate and analyse social and economic conditions which impede northern people from participating in northern development, continued in 1969. Continued use will be made of the data and analysis obtained by communicating and explaining the findings to persons concerned with social development in the North.

In addition to the Mackenzie Delta Project, a number of other research projects were initiated or continued. They included projects in anthropology, sociology and geography.

The Scientific Research Laboratory at Inuvik, Northwest Territories, which includes an annex for cosmic-ray measurements, was opened in 1964 and provides general laboratory and other facilities to support a variety of scientific disciplines. The Laboratory contains low-temperature rooms and special Arctic experimental facilities in addition to general laboratories, photographic darkroom, library, offices and seminar rooms. Approximately 250 investigators and 150 scientific projects were supported by the laboratory staff during 1969. Seven of the abandoned intermediate DEWline stations have been reserved for use as required for scientific purposes.

##### **Grants Program**

*Northern Research Institutes and Scientific Research Expenditures.* During the eighth year of this program of assistance to northern research institutes and northern scientific expeditions, amounts totalling \$250,000 were awarded, as recommended to the Minister by a Grants Committee. Through this grants program a large number

of northern research projects were supported, in a wide variety of scientific disciplines. Grants were made to:

Arctic Institute of North America  
Arctic Studies Group (L'Université de Montreal)  
Boreal Institute (University of Alberta)  
Canadian Research Centre for Anthropology (University of Ottawa)  
Centre d'Etudes Nordiques (Université Laval)  
Committee on Northern Studies (University of Manitoba)  
Committee on Arctic and Alpine Research (University of British Columbia)  
Institute for Northern Studies (University of Saskatchewan)  
President's Committee on Northern Area Studies (Lakehead University)  
Committee for Arctic and Sub-Arctic Research (University of Toronto)  
Senate Committee of Northern Research (Bishops University)  
Arctic Studies Conference (University of Alberta)  
Institute of Social and Economic Research (Memorial University)  
McGill Committee for Northern Research (McGill University)  
The Somerset Island Expedition (University of Ottawa)  
The Devon Island Expedition (Arctic Institute of North America)  
The Icefield Ranges Research Project (Arctic Institute of North America)

### Grants to Universities

*Research into applied problems to meet specific departmental requirements.* This program of grants was initiated in 1969-70 with an amount of \$50,000. Its purpose is to support research in problem areas specified by the department. Grants were made to the Faculty of Architecture, (University of Toronto) Urban and Regional Planning, and the Geography Department (University of Saskatchewan).

The grants program will continue to encourage research in the North, as well as continued support to the Arctic Institute of North America for the publication of the *Arctic Bibliography* with an annual grant of \$30,000.

### Research Directed by the Group.

The main components of the Group's research program are noted below:

Study of problems related to the relocation of Eskimos to centres of employment, begun in the summer of 1967, will be continued.

Continued use will be made of the data and analysis obtained in Mackenzie Delta Research Project, by communicating and explaining the findings to persons concerned with social development in the area.

Study of the social implications of the Northern Public Housing Program, and of the concentration of northern people in larger settlements, will be continued.

The collection and analysis of social and historical data dealing with northern development will be continued, together with the provision of such information to scientists and other users.

The reviewing, abstracting and distribution of information about research and development in Canada, Alaska, Greenland and the Soviet North will be continued.

Study of technological problems associated with northern development.

The Scientific Research Laboratory at Inuvik, Northwest Territories, will continue to provide facilities.

## DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

### TERRITORIAL RELATIONS BRANCH

#### TERRITORIAL DIVISION

##### Responsibilities

Acting for the Federal Government in the negotiation and administration of federal-territorial financial arrangements with both territories.

Reviewing both the fiscal and legislative programs and development plans of the Yukon Territory and Northwest Territories and advising the Deputy Minister on policies relating to the administration of the territories.

Acting liaison between the Department of Indian Affairs and Northern Development and the governments of the Yukon Territory and the Northwest Territories in respect to residual federal functions not related to natural resources.

Provision of advisory services to the Yukon Territory and the Northwest Territories in respect to the administration of government in the two Territories.

Co-ordination of the transfer of government functions and services to the Government of the Northwest Territories in Yellowknife heretofore under the jurisdiction of the former Northern Administration Branch.

##### Long-Term Plans

To develop long-term federal-territorial policy and fiscal arrangements with both the Yukon Territory and the Northwest Territories and to assist the governments of the two territories in the exercise of their responsibilities and in developing a more responsible form of government. To assist territorial fiscal programs, legislation and policy proposals.

#### Review of 1969 Operations

Financial and administrative assistance to the Governments of the Yukon Territory and the Northwest Territories was continued. Financial support rendered for 1969-70 was as follows:

##### Financial Agreements

<i>Yukon Territory</i>	(dollars)
Operating Deficit Grant	5,306,014
Agreement Project Loan Capital	3,615,832
Amortization Grant	1,355,986
<i>Northwest Territories</i>	(dollars)
Operating Deficit Grant	8,718,409
Capital Loans (Agreement)	3,606,225
Amortization Grant	1,628,307

(continued)

## Additional Financial Assistance Outside the Agreements

### *Yukon Territory*

	(dollars)
Faro Access Road Loan	100,000
Low Cost Housing Loans	430,000

### *Northwest Territories*

Centennial Grant	290,000
Pine Point Development Loan	200,000
Employee Housing Loan	180,000
Contribution — Hospital Care of Indians and Eskimos	546,100
Loans — Territorial Housing	855,000
Loans to Municipalities (Yellowknife and Inuvik)	320,000
Mackenzie Transfer Grant	14,337,835

The Division had a main role in negotiating federal-territorial financial agreements to commence April 1, 1970, for the Yukon Territory and the Northwest Territories.

The Division provided advisory services on territorial affairs, the completion of the transfer of federal functions to Northwest Territories jurisdiction in the Mackenzie District and the initiation of the transfer of federal functions in the Keewatin and Baffin Regions of the Arctic District to the Northwest Territories Government. While the Northwest Territories Administration in Yellowknife assumed responsibility for all administrative functions in the Mackenzie effective April 1, 1969, with the exception of education which was September 1, 1969, the Arctic District schedule of transfer was as follows:

November 1, 1969	Welfare
December 1, 1969	Industrial Supply Engineering (O & M)
April 1, 1970	Northern Housing Personnel Finance Education
August 1970	Teaching Staff

### Plans for 1970

Plans for 1970 include continuation of co-ordinating services in relation to the transfer of federal functions to the Government of the Northwest Territories in the Keewatin and Baffin Regions of the Arctic District for completion by April 1, 1970, except for the teachers who are due to transfer by August 22, 1970. Arrangements will continue for the setting up of the Joint Federal-Provincial Administration to be located in Quebec City which will administer the functions formerly performed by the Arctic Quebec Regional Office.

The administration, co-ordination and supervision of a one-year financial agreement which commences April 1, 1970 for the Yukon Territory and the Northwest Territories as follows:

	Yukon	Northwest Territories
Operating Grant	\$4,063,786	\$26,598,000
Amortization Grant	1,678,000	2,209,000
Capital Loans	4,911,603	10,207,500

Arrangements have been made to bring the financial negotiations with the Northwest Territories into the Program Review Procedure for the 1971-72 financial agreements.

A full liaison role will be established with the Northwest Territories Government by the stationing of a liaison officer at Yellowknife early in 1970.

## DEPT OF INDIAN AFFAIRS & NORTHERN DEVELOPMENT

### TERRITORIAL RELATIONS BRANCH

#### ARCTIC DISTRICT

##### **Responsibilities**

To implement in the Arctic District the policies of the Department as directed by the Territorial Relations Branch.

##### **Review of 1969 Operations**

##### **Organization**

Three Regional Headquarters were maintained. The Keewatin Regional Office at Churchill supervised area offices at Eskimo Point, Whale Cove, Rankin Inlet, Baker Lake, Coral Harbour and Chesterfield Inlet. The Baffin Regional Office at Frobisher Bay supervised area offices at Broughton Island, Cape Dorset, Igloolik, Pangnirtung, Pond Inlet and Resolute Bay. Regional Headquarters for Arctic Quebec continued to operate in Ottawa, supervising area offices at Great Whale River (Poste-de-la-Baleine), Port Harrison (Inoucdjouac), Povungnituk, Sugluk (Sagluc) and Fort Chimo.

In accordance with the Federal Government's plan to transfer administrative responsibility for the Northwest Territories to the Government of the Northwest Territories, a task force was appointed to make recommendations regarding the operation of the territorial government in the Eastern Arctic and the various aspects of the transfer, such transfer to be completed by April 1, 1970.

In so far as the Arctic Quebec Regional Office is concerned, plans are underway to move this office to the Quebec City Regional Office of this Department.

##### **Engineering and Housing**

The following two pilot projects were initiated successfully in the District: airlift of materials from Montreal to Frobisher Bay via Nordair resulted in reduced rates and faster delivery of materials to the site; and use of a helicopter to deposit sea-lift freight from cargo vessels to the settlements of Cape Dorset and Coral Harbour.

Maintenance of buildings was carried out by staff members working out of Akudlik and Rankin Inlet in the Keewatin, out of Frobisher Bay in the Baffin Region and out of Fort Chimo and Great Whale River in Arctic Quebec. Emphasis was placed on employment of as many local people as possible to work with tradesmen and the Baffin Region reported as high as 80 per cent of transient crews consisting of local people.

Northern Construction Section reports that the 1969 construction amounted to \$3.21 million worth of capital construction, mainly in the Baffin Region.

The new development complex at Frobisher Bay, consisting of an apartment building, administration building, hotel, shopping centre, recreation centre, and

town housing valued at \$11 million, well ahead of schedule is proceeding with occupancy of office building complex commencing in mid-January 1970.

### **Electrical Power**

The Department is responsible for the provision of electrical power in all communities with the exception of Baker Lake, Chesterfield Inlet, Akudlik, Frobisher Bay and Resolute Bay. The Department provides diesel electrical power to settlements in Arctic Quebec with the exception of three settlements. Great Whale River and Koartak power is bought by the Department from Quebec Hydro and Port Harrison by arrangements with DOT.

### **Municipal Services**

In communities where co-operatives and housing associations are active, contracts have been let for water delivery, sewage and garbage disposal. In larger communities, such as Frobisher Bay, similar contracts have been awarded to private companies.

The year 1969 saw an acceleration in the program to provide each community with bulk-oil storage tanks. With the installation of storage tanks at Arctic Bay, Grise Fiord and Broughton Island, all settlements in the District now have bulk oil storage.

The Department is responsible for fire protection in all departmental buildings and each unit has been equipped with fire extinguishers and the larger buildings with fire alarm systems. Alarm systems have also been installed in major settlements and local fire brigades have been organized in cooperation with the Northwest Territories Fire Marshal.

### **Plans for 1970**

In accordance with the Department's commitments to transfer many of its responsibilities to the Government of the Northwest Territories, the Engineering and Housing functions were transferred at the end of the 1969 calendar year. Arrangements have been made with the Technical Services Branch of the Department to carry over on behalf of the Government of the Northwest Territories, the capital construction program of specified items in the District for the 1970-71 fiscal year.

### **Education**

In 32 schools, 125 elementary classrooms, one high school classroom, 23 special classrooms and six vocational shops were in operation. The total enrolment was 3,543 pupils of whom 2,930 were Eskimos, 52 Indians and 561 others. In addition, 447 students attended the Duke of Edinburgh School in Fort Churchill (a Province of Manitoba Academic Public School, teaching all grades, kindergarten and up, and operated by the Department).

The enrolment in the small hostels in the Northwest Territories was reduced because of the introduction of the new Eskimo Rental Housing Program. Over 190 Eskimos attended trade or occupational courses in southern Canada during 1969. Two hundred Eskimos were enrolled in the Churchill Vocational Centre at Churchill. In June 1969, the third class of Eskimos graduated from the Churchill Vocational

Centre. The majority of these graduates went on to further advanced training in southern Canada. The relocation of Eskimos continued to Guelph, Ontario. Eskimos were employed on a rotation basis at Alert, Northwest Territories.

A new Adult Education Centre was opened in Chesterfield Inlet in the fall of 1969.

### **Plans for 1970**

While the education program will be operated by the Northwest Territories Government from Yellowknife, the Department will be responsible for a number of education functions. The Churchill Vocational Centre and the Duke of Edinburgh School at Churchill, Manitoba, will be operated on behalf of the Government of the Northwest Territories by the Department.

In addition, on behalf of the Government of the Northwest Territories, a small education group will be retained in Ottawa to be responsible for the administration of the programs at Churchill and to provide counselling services across Canada for trainees and students in the South. The group will also be responsible for the relocation projects at Lynn Lake and Guelph.

The Eskimo Language school at Rankin Inlet, Northwest Territories, will be a federal operation and will be administered by the education group in Ottawa.

### **Industrial**

Resource harvesting ranged from the production of cod fillets at Port Burwell to soapstone mining in the Keewatin. The commercial fishery at Port Burwell reached its quota (20,000 lbs) and successful local fisheries were carried out at Pangnirtung, Belcher Islands, Chesterfield Inlet and at Kaminak Lake in the Keewatin Region.

Sufficient quantities of soapstone were mined at Belcher Islands, Ferguson River and Rankin Inlet to supply the local needs and that of other settlements in adjoining areas.

Surveys were completed on the lapis lazuli production at Lake Harbour and samples of this mineral were shipped for analysis and preliminary reports received are encouraging.

The production and marketing of eiderdown at Belcher Islands, Port Burwell and Pangnirtung was expanded during the year, and although the greater proportion was marketed in the South small quantities were retained for the manufacture of garments.

Renovation work was completed on the laundry and drycleaning establishment at Frobisher Bay which was relocated to a new building. The Rankin Inlet Cannery had another successful season with the processing of 107 whales from the Whale Cove plant and 30,000 pounds of fish produced in the Rankin area. A successful side-project of the Rankin Cannery operation was the acquisition of 50 pigs which were fed on by-products from the cannery.

Contracts were entered into by the Department with Industry to set up a pilot knitwear operation at Frobisher Bay and a pilot weaving project at Pangnirtung. A

duffle garment project at Baker Lake gives promise of being a successful venture. The market for products of Eskimo arts and crafts continues to be strong. In 1969, total production in the Arctic District was in excess of \$1,000,000.

In co-operatives the most noteworthy development in the District was the continuation of work in the promotion and organization of a federation of Eastern Arctic Co-operatives. The Committee of Organization, represented by four Eskimo delegates, elected at the March 1969 Frobisher Bay Conference, carried out its work program efficiently and visited all co-operatives and developing groups in the District.

The annual training course at Western Cooperative College, Saskatoon, was again successful with 12 management trainees undergoing intensive training in cooperative management and related work.

In the field of tourism, the Department turned over its camp at Whale Cove to a private entrepreneur, and plans are now underway for the transfer to private enterprise of the camp at Clearwater Fiord in Cumberland Sound.

#### **Plans for 1970**

In accordance with the Department's commitments to transfer many of its responsibilities to the Government of the Northwest Territories, the industrial function was transferred at the end of year. In 1970, the Government of the Northwest Territories will have total responsibility for industrial activities in the Eastern Arctic.

#### **Welfare**

The welfare function was transferred to the territorial government on November 1, 1969, and it is hoped that the Government of the Northwest Territories will be able to surmount the problem of recruiting social workers as the shortage of staff had an adverse effect on the extension of professional social services to all residents of the Eastern Arctic.

Social assistance costs levelled off in the last two years and no large increase was noted in 1969.

#### **Plans for 1970**

All welfare functions will be the responsibility of the Department of Social Development, a new administration unit in the Government of the Northwest Territories. That Department plans to review all policies, objectives and procedures of existing programs to further consolidate welfare functions and responsibilities under the new administration.



# **DEPARTMENT OF JUSTICE**

## DEPARTMENT OF JUSTICE

### Responsibilities

Giving legal advice, preparing draft ordinances and advising and assisting on the administration of justice in the Territories, including the organization and maintenance of territorial courts of civil and criminal jurisdiction; the appointment of judicial officers, Justices of the Peace, Magistrates and Juvenile Court Judges; the direction and conduct of court proceedings on behalf of the Crown, including prosecutions under the Criminal Code and the Territorial Ordinances.

### Review of 1969 Operations

As in the past, legal advice was given on a number of problems. Draft ordinances were prepared. Criminal proceedings were conducted by Crown Counsel when necessary before the respective superior courts, Justices of the Peace and Police Magistrates. The Police Magistrates, when required, also act as Juvenile Court Judges. During the year, authority was granted for the payment of a set fee to Justices of the Peace for each case dealt with. Negotiations with the respective Territorial Governments were commenced with a view to the transfer to the Territorial Governments from the Department of Justice of the responsibility for the administration of justice in the Territories.

### Plans for 1970

It is hoped that negotiations with the Territories will be completed during 1970 and the responsibility for the administration of justice in the Yukon Territory and Northwest Territories will be assumed by the respective Territorial Governments.

**DEPARTMENT OF  
MANPOWER AND IMMIGRATION**

## DEPARTMENT OF MANPOWER AND IMMIGRATION

### Responsibilities

The fundamental purpose of the Department is to further the economic growth of Canada by endeavouring to ensure that the supply of manpower matches the demand qualitatively, quantitatively and geographically; and to assist in the development of the Canadian economy by encouraging a flow of desirable immigrants, adaptable to the needs of the country and by controlling the entry or stay in Canada of non-immigrants.

### Long-Term Plans

The services of the Department will be extended to reach those people living in outlying areas who, at present, are not able to participate fully in the services offered by the Department. Branch and seasonal offices and itinerant services are proposed for these remote areas.

The long-term plans of the Department's northern offices continue to be to determine the manpower needs of northern employers and to arrange for suitable training courses for workers resident in the North in order that their job qualifications might be acceptable to these employers.

### Review of 1969 Operations

In 1969, a full time office was in operation in Yellowknife, a seasonal office opened in Hay River and itinerant service was provided to communities such as Fort Smith, Inuvik, Coppermine, Cambridge Bay and others. A total of 3,909 workers and employer clients requested assistance last year, either to seek employment or to recruit workers. Many worker clients from the North lacked either the basic education or skill level to take advantage of existing opportunities. Counselling these clients and referring them to training continued to be of prime importance.

In 1969, training courses were available in the Northwest Territories for basic skill development, clerk typists, heavy duty mechanics and heavy equipment operators. A number of clients were referred to provincial based training courses such as oil well drilling and water navigation. Forty-eight apprentices were also referred to apprenticeship training courses in Alberta and British Columbia.

Most clients referred to training were required to travel to other areas to take training and mobility assistance was utilized to move these clients.

Employers in the North are acutely aware of the lack of skilled workers in the North. As a result, a number of industry-based training courses under the Occupational Training for Adults Program has trained employers in such fields as the fur garment industry, mining, air transport, supervisory training and lumber grading.

### Yukon Territory

The Canada Manpower Centre in Whitehorse placed 1,591 workers and a total of 3,788 persons contacted the CMC seeking employment. Training courses and mobility assistance comparable to that of Yellowknife was provided.

### **Frobisher Bay**

The Indian Affairs and Northern Development Officer continued to provide departmental services on a part-time basis. A total of 375 clients were assisted during the year.

### **Immigration Activity**

During 1969, a total of 194 persons admitted to Canada as immigrants gave their destination address as being either the Yukon Territory or the Northwest Territories. Of this number 100 were destined to the labour force and the remainder were dependents.

## **Plans for 1970**

### **Northwest Territories**

The Yellowknife Canada Manpower Centre plans to continue to expand contacts with employers in Yellowknife, Hay River, Inuvik and other points that will be serviced on an itinerant basis. Training service will be increased in 1970 and additional courses, such as carpentry, welding, guide training, and certified nursing assistants courses will be available in the North. Continued liaison with the Government of the Northwest Territories, employers and schools will result in further programs for manpower development.

### **Yukon Territory**

Training-in-industry programs will be developed to meet the expanding needs of the mining industry.

The steady flow of supervisory personnel going to supervisory development training programs being presented in British Columbia will be maintained. This may be limited by the inability of some firms to release senior personnel even for periods as short as one week.

An effort will be made to determine the total number of summer job opportunities for students in the Yukon Territory and arrange for the most efficient use of the available students.

### **Frobisher Bay**

As it may become essential for the Department to have a permanent departmental member at Frobisher Bay, serious consideration will be given to providing such a person subject to the present budgetary restrictions.



**DEPARTMENT OF  
NATIONAL DEFENCE**

## DEPARTMENT OF NATIONAL DEFENCE

### CANADIAN ARMED FORCES

#### Responsibilities

Support of Canada's national policies by contributing to the maintenance of Canadian sovereignty.

All aspects of maritime, land and air defence. In some areas, these tasks are done in co-operation, or shared with the U.S.A. and other allies under international agreements.

Provision of search and rescue services.

Assisting other government and commercial agencies.

#### Long-Term Plans

The Department of National Defence will continue to reassess its objective and activities in the Canadian North. Studies to date have indicated a need for a more active military role and steps are being taken to increase the tempo of military activity, consistent with the Department's responsibilities and resources. A field survey operation is planned for the northern coast of the mainland from Coppermine to the Melville Peninsula during 1971. Research programs will continue.

### Review of 1969 Operations

#### Maritime Forces

Although no naval ships operated in the Arctic in 1969, the Canadian Forces accepted the Department of Transport's invitation to embark two officers on the *John A. Macdonald* as observers for her operations in support of the tanker *Manhattan*. Additional support was given to the *Manhattan* project by maritime patrol and Tracker aircraft which conducted ice reconnaissance flights. This was the first northern deployment of the Trackers which flew a total of 148 hours in support of the project, operating from deployed bases at Cape Dyer, Resolute and Inuvik. Tracker (CS2F) routine patrols produced a further 234 hours in the Arctic. In addition, Maritime Command Argus aircraft from Comox, Greenwood and Summerside increased their routine Arctic operations to include weekly deployments to Cold Lake, Namao, Winnipeg, Yellowknife, Churchill, Frobisher or Goose Bay for 1,004 hours surveillance between 60 degrees north and the North Pole. Clearance diving teams supported the DEWline resupply operations again this year.

#### Land Forces

*Arctic* — Several ground reconnaissances were made preparatory to expanding both the scale and scope of land force military operations and manoeuvres in the North. Areas covered in 1969 included the Mackenzie Delta, Central Archipelago and Eastern Keewatin.

*Sub-Arctic* — One major field exercise was held along the axis of the Alaska Highway in northeastern British Columbia during December 1969. In addition, one mountain climbing expedition was held in southern Yukon Territory in mid-summer.

## **Air Forces**

Air Transport Command continues to provide regular scheduled Hercules air service to CFS Alert routing via Ottawa — Thule, Greenland — Alert — Resolute Bay — Ottawa and to CFS Inuvik from Edmonton

Air Transport Command provided the airlift for the annual resupply of CFS Alert and the joint Canada — United States Weather Station at Alert Bay staging this resupply through Thule, Greenland. A total of 185 Hercules loads of fuel oil and general cargo were lifted during the year. Hercules aircraft have also visited DEWline sites periodically.

Cosmopolitan aircraft were used for the first time on gravel airstrips in 1969 and Buffalo aircraft from Mobile Command took part in a Land Forces exercise and were used to carry out a reconnaissance for a series of exercises to be conducted in 1970.

A total of five major searches were conducted north of the 60th parallel which entailed approximately 900 flying hours.

## **Communications**

Communications research activities continued at CFS Alert and CFS Inuvik with a slight increase in manning at both locations. Transportable TACAN beacons were installed at Alert and Resolute Bay for use by suitably equipped aircraft operating in these areas. Reliable communications were established between Resolute Bay and Ottawa using two UHF transportable Canadian Forces satellite terminals. In addition, a one-month trial of satellite communications was performed from Churchill as a joint Communications Research Centre/Canadian Forces program.

## **Plans for 1970**

### **General**

Canadian Forces Liaison Detachments are now stationed in Whitehorse, Yukon Territory, and Yellowknife, Northwest Territories to assist in coordinating Canadian Forces activities in the North. A similar detachment is planned for Frobisher Bay on a trial basis to assist maritime air activities. Canadian Forces schools of instruction will participate in trades training for Eskimos to be trained in the South for employment in the North. The Minister of National Defence has announced that a small headquarters is likely to be deployed in the North in 1970.

### **Maritime Forces**

Current plans call for three ships to visit northern ports in support of the Northwest Territories Centennial. Naval visits will coincide with community celebrations at Frobisher Bay on August 3, 1970, and with commemorative ceremonies at Rankin Inlet. Visits will also be made to Coral Harbour, Southampton Island and Wakeham Bay. Churchill, Manitoba, will also be visited during this cruise. To facilitate continued Arctic surveillance, Argus aircraft will increase deployments to such northern airfields as Frobisher Bay and as current plans provide support facilities. Tracker aircraft will be used for coastal patrols in the Goose Bay and Fort Chimo areas. Clearance divers will continue to operate in support of DEWline

resupply. It is intended to evaluate Department of National Defence submersibles in Arctic waters in co-operation with other government agencies.

### **Land Forces**

One major environmental training exercise and two unit size manoeuvres are planned for 1970. In addition, environmental training will be conducted in the Eastern Keewatin District during the period, April 1 – December 30, 1970. Using a base camp at Fort Churchill troops will exercise in the Baker Lake, Rankin Inlet, Coral Harbour areas – during the period April 1 – June 30. Beginning July 1, base camp will be relocated to Resolute Bay and troops will exercise in the Eureka, Mould Bay, Sachs Harbour and Isachsen areas. On September 1, base camp will return to Fort Churchill and exercises will resume at Baker Lake, Rankin Inlet and Coral Harbour. Field engineers and construction engineers will build a bridge across the Ogilvie River at mile 123 of the Dempster Highway in the Yukon Territory. A field survey party of five men will operate in the Cambridge Bay area for a six-week period during the summer.

### **Air Forces**

Hercules aircraft will continue to operate regular schedules to CFS Alert and CFS Inuvik and will resupply CFS Alert. The increased tempo of Land Forces environmental training will result in a comparable increase in air transport activity in support of this training and a Hercules aircraft is expected to be used extensively in support of communications research activity.

### **Communications**

Communications research will continue at the present level. A small portable SHF satellite terminal will be deployed to several northern locations to investigate propagation phenomena.

## **DEPARTMENT OF NATIONAL DEFENCE**

### **DEFENCE RESEARCH BOARD**

#### **Responsibilities**

To bring scientific knowledge and experience to the assistance of the Armed Services in solving problems of military operations in high latitudes. To sponsor and undertake research and technical projects of particular assistance to the Armed Services.

#### **Long-Term Plans**

Research projects of two main types will be conducted: basic studies in the laboratory and applied studies or field investigations. Almost every aspect of science is involved, with emphasis on factors, particularly cold, affecting the behaviour of man and his machines and the physical sciences affecting communications, movement and navigation in and under the sea, on land, in the air and in outer space.

#### **Review of 1969 Operations**

The Defence Research Board conducted research projects on Arctic and cold weather problems through its establishments in Ottawa (DREO), Toronto (DRET), Dartmouth (DREA), Esquimalt (DREP), and Valcartier (DREV). It also supported and coordinated research in the North by means of grants and contracts to universities, government agencies and non-government research organizations. Close collaboration was maintained with research and development agencies in other countries, especially the United States and Britain.

#### **Geophysical and Biological Research in Northern Ellesmere Island**

Field parties were based at Tanquary Camp in northern Ellesmere Island from early April until the middle of June and again briefly in late August and early September. Support was provided by Canadian Forces C-130 Hercules aircraft from the south to Eureka and Alert, thence by light aircraft under commercial charter. A total of fourteen scientists were in the field for periods varying from three weeks to two months; three were from DREO staff and six were working under DRB contracts with McGill University, while the remainder were from Ottawa University, Dartmouth College (New Hampshire) and the Smithsonian Institute (Washington, D.C.). The McGill University group received additional support from the office of Naval Research, United States Navy, for sea-ice research.

#### **Oceanography and Limnology**

In the second half of April a two-man party conducted a 500-mile oceanographic traverse from Tanquary Camp over the ice by motor toboggan, occupying six stations in Canon Fiord and two stations in Borup Fiord. No oceanographic stations had previously been occupied in these fiords. During May, a four-man oceanographic party, operating from Ward Hunt Island, intended to occupy a number of stations by air in the Arctic Ocean. However, open water and rough ice made it impossible for the aircraft to land anywhere within 100 miles of the coast, and so attention was turned to limnology. A number of lakes near the north coast of Ellesmere Island and

inland were investigated for temperature and water composition. Three of the lakes near the north coast were found to be density stratified, with temperature maxima (up to  $+10^{\circ}\text{C}$ ) at depths of about 15 m. Water samples were collected for radiochemical analysis at the Smithsonian Institute. A paper on this work has been accepted for publication.

Field experience with air-supported parties was analyzed to determine the most efficient method of operation in the Norwegian Bay area where oceanographic work may be conducted in the future. If the support aircraft is fitted out as a mobile laboratory with sleeping and cooking facilities and if the operation is carried out early in the season when the weather is fine and ski-landing conditions are good, it would seem as economic to attach an aircraft to the field party as to conduct a traverse by motor toboggan.

### **Sea-ice Physics**

From mid-April until late May a two-man party investigated high-frequency audio-absorption in sea-ice from a mobile laboratory set out on the sea-ice near Tanquary Camp. They made three series of experiments, the results of which are now being analyzed: a) transmission measurements in the ice cover over a horizontal path for ten different lengths — CW at frequencies of 10 KHz to 1 MHz and pulse techniques at selected frequencies were used; b) transmission measurements over a vertical path through the ice cover for several path lengths; and c) transmission measurements of waterborne sound — after reflection at the water-ice interface — as a function of angle of incidence.

### **Other Studies**

From the middle of May until the middle of June, glaciological studies were carried out on the Ward Hunt Ice Shelf and adjacent ice rise. An assessment of the snow cover and of the 1968 summer melt was obtained from measurements at stake grids established in previous years. A paper on ten years' records of climate and mass balance from this area has been accepted for publication. A drilling program was also undertaken on the ice shelf and ice rise for the main purpose of obtaining accurate englacial temperature profiles, from which it may be possible to deduce the age of the ice shelf. A total of seven holes were put down by a combination of thermal means; one of the holes penetrated the ice shelf where it was 46 m thick and apparently floating on salt water. In early September, during cache-laying flights over Nansen Sound, the extent of a plug of old, very thick polar ice which blocks the northern end of the sound was delineated for future investigations.

### **Construction**

Two 12 x 12 m steel-frame buildings were shipped to Tanquary Camp in 1968. One of these buildings has now been erected and provides excellent storage and workshop space; it is planned to erect the other in 1970.

### **Under-ice Acoustics**

DREP operations in the North consisted of the measurement of sound propagation phenomena under the ice in McClure Strait. A party of four scientists and technicians operated a camp for about six weeks. A similar operation will take place in the spring of 1970.

## Environmental Biology

Research in certain biological problems of cold environments has continued at the Board's Toronto establishment. Studies of the effects of cold exposure on the susceptibility and resistance of the body to infection have shown that changes in immunological reactivity do occur under these conditions. The cellular aspects of these changes are being investigated. The preferential utilization of fat for heat production in cold exposed animals has been demonstrated and factors important in controlling the over-all rate of energy production are being investigated. Continued attention is being given also to the decrease in resistance to cold which results from exposure to combined cold and altitude.

## GRANTS

Twenty-nine grants were allotted to the following universities:

McGill University for research on the engineering properties of frozen soil;

McGill University for a study of deformation of ice a high reduction and strain rates;

Laval University for a study of the vehicle forces imposed by ice under confined conditions;

The Arctic Institute of North America for a study of the North Water;

Victoria University for model studies on reverberation from sea ice;

York University for work on the reactions of the constituents of the upper atmosphere;

McGill University for instrument development for tabulating drag coefficients in the boundary layer below an ice sheet;

Ottawa University for a study of the preservation of permafrost by means of a two-phase thermosyphon;

The University of New Brunswick for an investigation of the methodology for establishing an inventory of miskeg in Canada and Northern Europe;

Queen's University for a study of the stability of miskeg subject to a superimposed load;

University of Saskatchewan on Northern Canada transportation study;

The Royal Military College for evaluation and stabilization of highly compressive terrain for use as V/STOL aircraft landing sites;

The University of Western Ontario for research on the physics of the troposphere as related to UHF radio transmissions;

The University of Western Ontario for studies on VHF radio wave scattering in the ionosphere;

The University of Saskatchewan on particle influx near the auroral zone;

The University of Western Ontario for support of ionospheric studies using satellites;

The University of Toronto for studies of hypothermia and endocrine function, the biochemical mechanisms involved in cold adaption and the effects of cold on pharmacological reactions;

University of Manitoba on effects of adverse environmental conditions on intellectual and perceptual processes;

Laval University for a study of circulatory adaption to cold stress;

The University of Western Ontario for investigation on mechanism of temperature receptors in acclimatization;

The Research Institute of the Hospital for Sick Children, Toronto, for studies on hypothermia and rewarming shock;

University of Guelph on effect of temperature stress on metabolism;

Queen's University for research on the reactive principles and specificity of bites of bloodsucking arthropods with particular reference to mosquitoes;

McMaster University for chemo-reception studies on bloodsucking flies, particularly Tabanidae;

The University of Manitoba for studies on the effect of developmental temperatures in determining the southern limit of northern mosquito species;

Queen's University for research to separate and identify the active principle of mosquito saliva;

Queen's University for research on movements of P32-tagged adult black flies;

The University of Saskatchewan for studies concerning western equine encephalitis virus in Saskatchewan; and

The Royal Military College on the physics of metals in very low temperatures.

## CONTRACTS

Six contracts were awarded as follows:

McGill University for research on ice physics, with special reference to the study of sea-ice;

McGill University for meteorological and geophysical work at Tanquary Fiord;

The Arctic Institute of North America to provide limited consultant work;

McGill University for a study of terrain evaluation and classification for mobility;

University of Saskatchewan for studies in radiation effects and their relationship to composition, heating and circulation in the stratosphere and mesosphere; and

Queen's University for research on the susceptibility of black flies to DDT, including field residues.

**DEPARTMENT OF NATIONAL  
HEALTH AND WELFARE**

## DEPARTMENT OF NATIONAL HEALTH AND WELFARE

### HEALTH SERVICES BRANCH

#### PUBLIC HEALTH ENGINEERING DIVISION

##### **Responsibilities**

The statutory responsibilities of the Division are derived from the National Health and Welfare Act, the Potable Water Regulations for Common Carriers (P. C. 1954-1213) under that Act and by Cabinet Decision (February 9, 1967) assigned responsibilities for the control and abatement of water pollution from federal facilities. The Division also provides extensive consultative and advisory services to the two territorial governments and to other federal departments and agencies operating in northern Canada, and to other agencies and individuals as requested, all in the general field of environmental health with particular emphasis on water quality and supplies, liquid and solid waste disposal and environmental sanitation.

##### **Long-Term Plans**

The long-term plans of the Division are to continue to provide the various types of services, as reviewed under "Review of 1969-70 Operations" below, and where possible or needed, expand these activities toward the over-all control and abatement of environmental health hazards. The Division's activities will continue to center around improvements in water quality and community water supplies, wastewater treatment and disposal, water pollution surveys, control, abatement and solid waste management.

#### **Review of 1969 Operations**

The operational responsibilities of this Division regarding northern environmental conditions related to water supplies and waste disposal are assigned to four of six regional offices of the Division (Pacific, Northern, Western and Eastern) with budgetary and program control in Ottawa. The respective jurisdictions of these regional offices are shown in the attached map.

A brief review of their operations, during the 1969-70 fiscal year, is set out hereunder.

##### **Pacific Region (Vancouver, B.C.)**

This office continued to provide advisory services to various federal departments and the Medical Services Directorate of National Health and Welfare on matters pertaining to water supplies, waste disposal and environmental sanitation. Under the Division's "Water Pollution Control and Abatement - Federal Facilities" project, this office examined a few community waste disposal facilities; approvals of waste disposal plans were given to Anvil Mine and Faro City, Destruction Bay, and Whitehorse Mackenzie Trailer Court, all in Yukon Territory. Technical assistance was given to the Department of Transport and the Government of the Yukon Territory regarding water treatment facilities (e.g. Tofino and Smither's Airport, Clinton Creek and the Experimental Farm).

### **Northern Region (Edmonton, Alberta)**

This office prepared sewage disposal regulations for adoption by the Northwest Territorial Council under the Northwest Territories Public Health Ordinance, and examined and reported on sewage disposal facilities in 18 communities of the Northwest Territories. Based on extensive investigations into the arsenic pollution of Yellowknife Bay, Great Slave Lake and recommendations by this office, a new water supply system was completed during the year. Continuing surveillance of the arsenic pollution of Yellowknife Bay is maintained.

Advisory services provided by this office included the continuing surveillance of bacterial quality and fluoridation of drinking water in several communities. In addition, this office prepared reports regarding water supply, waste disposal, environmental sanitation and related aspects of town planning in four communities of the Northwest Territories. Reports on environmental sanitation of 13 other communities were also prepared.

This office reviewed and commented on the results of 896 bacteriological analyses of water supplies. This office made recommendations to the Medical Services Directorate of the Department for the improvement of sanitary services and community planning in 17 northern settlements through field surveys and reports. In addition, this office reviewed plans for sanitary facilities in restaurants, hotels, apartment complexes, swimming pools and water supply systems.

Amendments to the Public Water Supply Regulations of the Northwest Territories were provided for adoption by the Northwest Territories Council.

Upon request, information and assistance were provided for 16 private persons, visiting the Northwest Territories from both Canada and the United States on such matters as water pollution control in Arctic areas, iron bacteria in water supply sources, corrosion control, swimmer's itch problem, sanitary requirements for restaurants, etc.

Staff of this office participated in:

- a) Northern Engineering Advisory Committee and Northern Engineering Services Sub-committee to coordinate engineering work between the Federal Departments and the Northwest Territories;
- b) the monthly meeting of MSD Northern Region Section Heads to coordinate and review Northern Health Services program.

### **Western Region (Winnipeg, Manitoba)**

This office carried out an environmental health survey at Rankin Inlet in the Keewatin District, covering most aspects of sanitation, with particular emphasis on waste disposal and pollution abatement.

Continued surveillance of drinking water supplies and waste disposal facilities was maintained by this office (including analytical services).

### **Eastern Region (Montreal, Quebec)**

Plans for facilities and accommodation at the Frobisher Bay Hotel, Northwest Territories, were reviewed and evaluated for compliance with health standards. This office carried out a survey of environmental engineering and water pollution control facilities at federal establishments, Frobisher Bay. This office continued to provide analytical services regarding water supplies and waste disposal.

### **Plans for 1970-71**

A major part of the activities of the Division's four regional offices operating in the North pertains to consultative and advisory services on a request basis. Therefore, although no specific plans could be made, provision is made for these services based upon workload experiences in the immediate past. In addition, the following specific projects are planned (subject to approval) for three regional offices as indicated briefly:

#### **Pacific Region (Vancouver, B.C.)**

Development of a water and wastewater treatment system for small isolated communities;

Iron and manganese removal from water sources serving small communities;

Continuation of surveillance and control of water pollution by liquid wastes from federal facilities; and

Inspection of community water supply and waste disposal facilities (six communities).

#### **Northern Region (Edmonton, Alberta)**

Sewage disposal studies in seven settlements in the Northwest Territories;

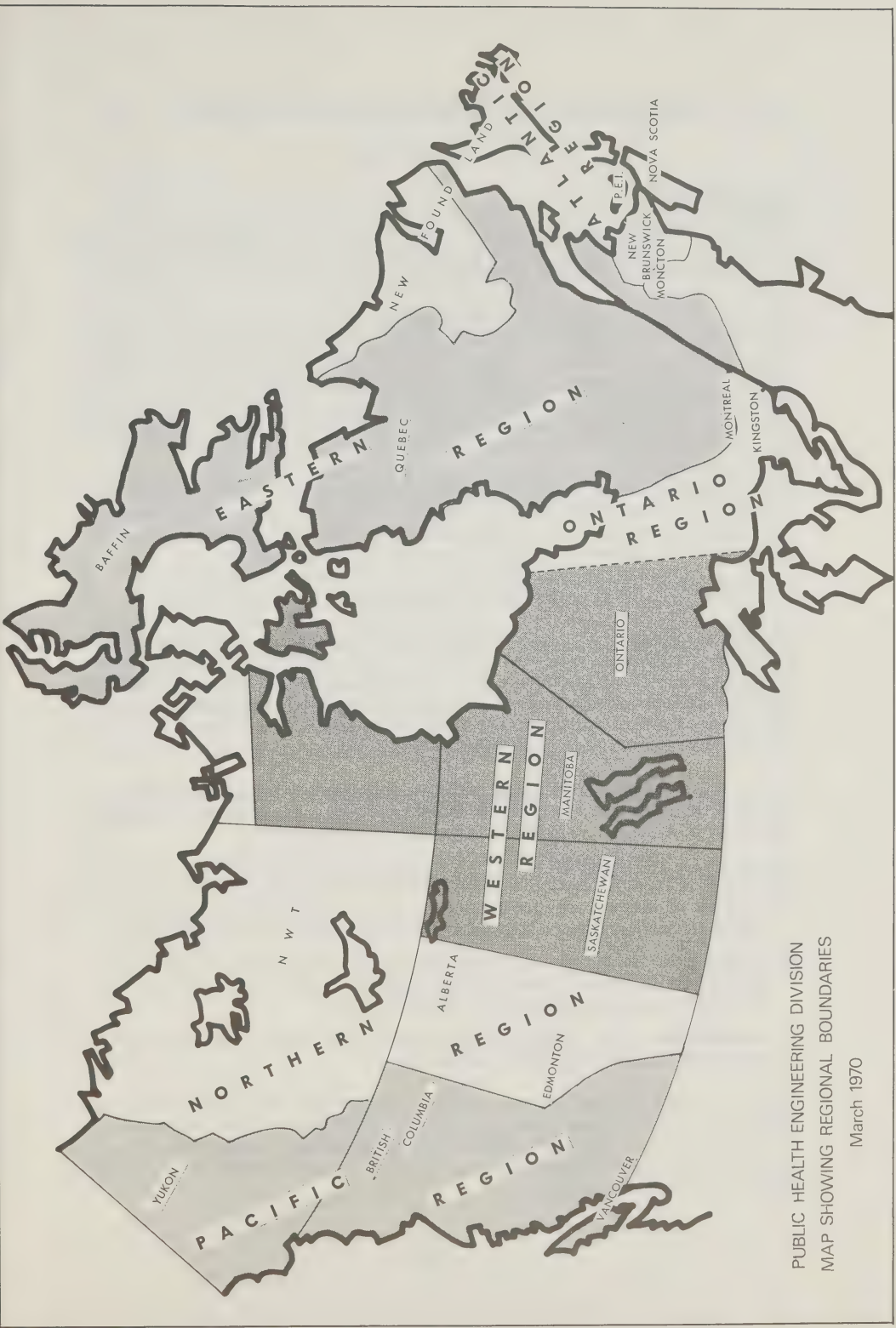
Study of water use and pollution in the Mackenzie District of the Northwest Territories;

Flocculation-coagulation studies in a package water treatment unit ("Rotoflow") of potential use value in the Northwest Territories; and

Preparation of solid waste disposal regulations for the Northwest Territories

#### **Western Region (Winnipeg, Manitoba)**

Environmental sanitation surveys at various sub-arctic settlements in the Keewatin District of the Northwest Territories.



PUBLIC HEALTH ENGINEERING DIVISION  
MAP SHOWING REGIONAL BOUNDARIES  
March 1970

## DEPARTMENT OF NATIONAL HEALTH AND WELFARE

### MEDICAL SERVICES

#### Responsibilities

The Medical Services Branch is responsible for the provision of total health care in the North. It has a dual role: that of a federal as well as of a provincial agency under special arrangements with both territorial governments.

The cost of this complete health and treatment program is shared by the federal and territorial governments. The Hospital Insurance Program is administered separately. In the Northwest Territories, it is administered by the Territorial Hospital Insurance Board, a Crown Corporation established under Territorial Ordinance. Hospital care is free to all bona fide residents, beginning at birth or three months after establishing residence in the Northwest Territories. Medical care insurance is being planned, but financing arrangements have not been worked out.

In the Yukon Territory, hospital insurance is administered by the Government of the Yukon. The Territorial Hospital Insurance Board acts in an advisory capacity. There is, at present, no intention of introducing a medical care insurance plan in the Yukon Territory, although preliminary planning has been carried out.

#### Review of 1969 Operations

The implementation of the Yukon Territory and Northwest Territories' Health Plans continued on schedule. All medical officer posts were filled, permitting more frequent visits to outpost stations. The placement of a second doctor at Churchill improved medical coverage in the Keewatin Area. A psychiatrist has been posted to Yukon Zone by the Department. Nursing recruitment has been aided by improved isolation post allowances negotiated for the area.

In addition, agreements were signed with two universities to provide comprehensive consultant and treatment services at Inuvik and along the western Arctic coast (University of Alberta) and in Baffin Zone (McGill University).

A number of surveys were carried out during the year including:

- a) A review of hospital requirements by a team from the Hospital Insurance and Diagnostic Services Division to assist in the future planning of these facilities;
- b) A mental health survey conducted by a team of three psychiatrists and a psychologist to provide guidelines for improved mental health services to both the Yukon Territory and Northwest Territories; and
- c) Continuation of the Yukon School Dental Pilot Project, with some noted improvement in dental conditions in the area.

Work was begun on four nursing stations: Rankin Inlet, Gjoa Haven, Faro and Dawson City. All were expected to be completed by March 1970. Eskimo Point Nursing Station was extended to provide accommodation for a third nurse and more adequate clinic space. A three trailer nursing station was placed at Port Burwell, which now has a full-time nurse.

Major reconstruction continued at Whitehorse General Hospital, Beaver Creek and Carcross.

### **Health Problems**

The leading causes of death continue to be related to accidents and other violence, pneumonia and diseases of infancy. Programs directed at tuberculosis, alcoholism and venereal disease remain major health activities. Although an outbreak of botulism in Cape Dorset resulted in three deaths, six additional victims were treated successfully with trivalent botulinus antitoxin.

In an effort to raise health status in the North to the same level as that in the rest of Canada, three courses of action are being pursued:

- a) Subsidies which help encourage private practitioners to settle in remote areas.
- b) Special financial or leave allowances are made to nurses and physicians, respectively, working in outlying areas; and
- c) Native peoples (Métis, Indian and Eskimo) are being trained to take an increasing responsibility in the promotion of hygienic standards.

### **Plans for 1970**

New pre-built nursing stations will be erected at Clyde River and Broughton Island and the existing clinic at Arctic Bay will be enlarged to a three-trailer nursing station. A new nursing station at Fort Resolution is also planned. A third nurse is to be employed at six major nursing stations to meet the increased workload.

The Yellowknife Hospital Society plans to enlarge Yellowknife Hospital with contributions from all levels of government.

Facilities and accommodation at Frobisher Bay will be improved.

In addition, measures are being taken to improve staff orientation prior to assumption of duties in any health facility.

The Northern Health Service is making every effort to support airstrip development at strategic locations and to have communications improved. Both are necessary for adequate health care delivery.

## **DEPARTMENT OF NATIONAL HEALTH AND WELFARE**

### **EMERGENCY WELFARE SERVICES**

#### **Responsibilities**

The Department of National Health and Welfare is responsible through the Emergency Welfare Services Division of the Special Programs Branch for assistance and advice to the Northwest Territories and the Yukon Territory in planning, organizing and operating the emergency welfare services. The Emergency Welfare Services Division also co-ordinates emergency welfare mutual support action between the North and the neighboring provinces.

#### **Long-Term Plans**

The aim of the program is to establish and maintain an emergency welfare services capability in the North. In the past, the Emergency Welfare Services representative in Edmonton, Alberta, established a close working relationship with government representatives from the North. For the past two years, contact with the North has been maintained from Victoria, B.C. After April 1, 1970, however, all Emergency Welfare Services regional offices will have been closed and liaison will have to be carried out directly from the Ottawa office of the Division. Although training has been limited, chiefly because of distances involved, an Emergency Welfare Services course was organized and carried out successfully in the past in Edmonton, Alberta.

#### **Review of 1969 Operations**

A Mobile Feeding Unit is stored in Whitehorse and another is located at Fort Smith. In 1969, two Welfare Centre Kits were shipped to Whitehorse, these contained the necessary forms for operations.

#### **Plans for 1970**

Arrangements are currently being discussed for training in 1970 and, in all likelihood, courses will be given in Edmonton for personnel from the North. Although our stockpiling program has been curtailed, the necessary Welfare Centre Kits and Mobile Feeding Units will be sent to the North when production of operational equipment is resumed.

**DEPARTMENT OF  
NATIONAL REVENUE**

## DEPARTMENT OF NATIONAL REVENUE

### CUSTOMS AND EXCISE

#### Responsibilities

To administer the Customs and Excise laws and regulations, particularly the Customs control of movement of aircraft and vessels.

#### Long-Term Plans

To increase Customs service in pace with the development of the North.

#### Review of 1969 Operations

The local ports of Whitehorse and Dawson, Yukon Territory, with their respective outports and other offices, continued operations under the District Port of Vancouver, B.C. Outports of Whitehorse were Carcross, Pleasant Camp and Beaver Creek; and under Dawson, the outport of Old Crow.

Edmonton's sub-office at Yellowknife, Northwest Territories, provided seasonal clearance service for commercial aircraft, conditional upon 72 hours advance notice of arrival being given to the main port. In addition to this, enforcement service was provided on a part-time basis at Inuvik by a local resident of the area employed by Customs for this purpose, through the Edmonton sub-office.

The RCMP continued to provide service on behalf of Customs at Frobisher Bay, under the jurisdiction of the Port of Goose Bay, Nfld.

At seventeen other points, officials of other government departments acted as Customs Officers for the purpose of clearing ships and aircraft. These were as follows:

#### Royal Canadian Mounted Police

Baker Lake	Pond Inlet
Cambridge Bay	Resolute Bay
Coppermine	Sachs Harbour
Eskimo Point	Spence Bay
Lake Harbour	Tuktoyaktuk
Pangnirtung	

#### Department of National Defence

Cape

#### Department of Transport

Alert	Isachsen
Coral Harbour	Mould Bay
Eureka	

#### Plans for 1970

Normal planning to meet responsibilities.

## **DEPARTMENT OF NATIONAL REVENUE**

### **TAXATION DIVISION**

#### **Responsibilities**

The administration and enforcement of the Income Tax Act, the Dominion Succession Duty Act, Part I of the Canada Pension Plan Act and the collection of part of the taxes imposed by the Old Age Security Act.

#### **Long-Term Plans**

Normal planning to meet the requirements of this area in light of any increases in population.

#### **Review of 1969 Operations**

Taxation matters in the Yukon Territory were carried out by a staff of nine people through the District Office located at Whitehorse with assistance from the Edmonton District Office and in the Northwest Territories by the Edmonton District Taxation Office.

#### **Plans for 1970**

Taxation matters for the Northwest Territories and the Yukon Territory will be dealt with by the Edmonton District Taxation Office and from the District sub-office located in Whitehorse.



# **DEPARTMENT OF PUBLIC WORKS**

## **DEPARTMENT OF PUBLIC WORKS**

### **Responsibilities**

Provide a construction service for government departments that carry on programs of resource and manpower development in the North. Aspects of this service include architectural, engineering and construction capabilities. Such capabilities include assistance in planning, site investigation, economic analysis, design, construction and management of buildings, utilities, highways, harbours, wharves and associated structures.

The Department of Public Works carries out, within its own terms of reference, the responsibilities in connection with site investigation, planning, construction and maintenance of buildings, highways, utilities and associated structures. A major responsibility exists for maintenance and development of the navigational capabilities in the North, such as the MacKenzie River System. Management and maintenance of federal government properties include buildings and housing. Leases are arranged where federal buildings are in short supply.

### **Long-Term Plans**

To achieve a higher standard of liaison and service to government departments in the North by:

- a) Continuation of research and improvement of techniques of construction special to the area;
- b) collection and compilation of data on the area development; and
- c) improvement in management, design and maintenance practices to carry out the requests of other government departments more efficiently.

To apply a higher standard of administration of the Department's program in the areas. The program includes such diverse items as upgrading the Alaska Highway and Haines Road; dredging projects on such locations as the MacKenzie River, Slave River; maintenance of river works; space requirement surveys for accommodation; utilities assessment vis-à-vis modern standards and demand usage.

The individual reports of the various Regional Offices of the Department are set out hereunder.

## **Review of 1969 Operations**

### **Pacific Region — Yukon Territory**

In the Yukon Territory and northeastern British Columbia the Accommodation Section was involved in the periodic restoration, repair and upkeep of 350 Crown-owned housing units and Post Office and federal buildings ranging from Dawson Creek in British Columbia to Dawson City in the Yukon Territory some 1,400 miles north. In addition, they maintain on behalf of the Royal Canadian Mounted Police the Detachment Quarters at Old Crow, the most northerly settled community in the Yukon Territory.

Periodic restoration included painting, interior and exterior, of 75 units and the replacement of approximately 80 furnaces.

Under the improvements general program, renovations were made to update the bathroom facilities in federal housing, street paving was attended to, and renovation of the lighting facilities in the Dawson Creek Federal Building was undertaken. Several other small contracts in connection with improvements to the existing facilities were undertaken during this fiscal year.

A day labour project was instituted to erect a 16,000 sq. ft. warehouse which was purchased from the Department of National Defence and this project will be substantially completed this year.

In addition to the programs mentioned above, the Accommodations Section, Yukon Territory, maintains of behalf of the transportation program all the living accommodation and garage facilities for all the maintenance garages situated on the highway.

### **Plans for 1970**

#### **Pacific Region**

The largest contract anticipated by Accommodations for 1971 is the renovation and upgrading of the lighting in the Federal Building, Whitehorse, Yukon Territory, for \$165,000 and the construction of two new dwellings for the maintenance road program in Teslin for \$70,000. In addition, there will be a re-location of one more dwelling from Swift River to Teslin to meet the changing demands for highway requirements.

The routine building maintenance and restoration program will continue as in the past. This will include exterior and interior painting, replacement of more outmoded furnaces and the painting of some of the major Federal Buildings in the District.

In the improvements general program further paving will be done and sound-proofing of duplex units is anticipated for this year. It is anticipated that a new Yukon Territorial Government Building will be erected at Watson Lake and this Department is entering into negotiations to obtain leased accommodation for our Postal Department in this building.

In reference to the accommodation for the highway operation, the fencing of compounds, renovations of water circulation systems and upgrading of lighting in some of the garages at various highway locations will be completed this year.

A planning program to anticipate future government requirements in the Whitehorse area will also be carried out this year.

### **Review of 1969 Operations**

#### **Pacific Region – Yukon Territory**

The program of upgrading and developing the road system in the North continued. On work undertaken for the Department of Indian Affairs and Northern Development on the Northern Roads Program, a two-year grading contract was awarded for the extension of the Dempster Highway from Mile 78 to Mile 123

(Ogilvie Bridge site), with 17 miles being completed along with an emergency flight strip at Mile 78. The contract for the permanent bridge at Drury Creek on the Campbell Highway (Ross River-Carmacks Development Road) was completed and a two-year contract was awarded for the gravel surfacing of this road from Carmacks to Ross River. The surfacing was completed between Carmacks and the Anvil Mine turn-off, using an additive of calcium chloride primarily as an experiment in dust suppression on this portion of the mine haul road from Anvil to railhead.

The construction of the precast flexible concrete approach ramp for the ferry at Dawson City, Yukon Territory, was completed and an additional contract awarded to provide an auxiliary ramp to facilitate long wheelbase or low-slung vehicles. Pre-engineering studies of the proposed Dempster Highway location were completed. The field survey for upgrading the road from Mile 0 to Mile 60 was also completed. In addition, a field survey for the construction from Mile 123 to Mile 168 was carried out along with site investigation and design of a bridge crossing the Ogilvie River at Mile 123. A permanent inspector was again stationed at Faro camp for the completion of the Anvil Mining Corporation's mine access road, which included a bridge over the Pelly River. Additional inspections were made of the Venus Mines Ltd. access road near Carcross and site investigation along with design of a bridge to cross the narrows at Carcross.

Maintenance of the Northwest Highway System continued. The maintenance of the B. C. section (Mile 83.6 to Mile 626) was performed entirely by contract. A three-year maintenance contract was awarded for the section of the Alaska Highway from Mile 83.6 to Mile 300. This contract replaced the original contract awarded in 1965. Contracts for crushing and surfacing between Mile 350 and 420 and 420 to 483 were also completed. Relocation and design were completed for Mile 285 to Mile 305 as part of the advance planning for eventual paving of this portion of the Alaska Highway. An engineering investigation of problems associated with difficult foundation conditions at four bridge sites was carried out by a consultant firm.

On the Yukon portion of the Alaska Highway, routine maintenance continued to be performed by departmental forces. During the summer, three surfacing crews, four crusher crews, one alignment crew, two culvert crews, one dust control crew and two miscellaneous crews were employed. During the winter, snow removal was carried out on the Alaska Highway and the Canadian section of the Haines cut-off road.

A contract for the realignment, grading and sub-base was awarded for Mile 909.2 to Mile 928.5 and extended to include Mile 904.5 to Mile 909.2. The contract was completed from Mile 910 to Mile 925 and it is anticipated that the remainder would be completed early in the summer of 1970. Pre-engineering surveys and design were completed for the application of base course, primer and pavement to the entire section from Mile 904.5 to Mile 928.5.

Investigation of the feasibility of relocating the highway from Mile 1146 to Mile 1152 was carried out to determine whether two stream crossings could be eliminated.

As a part of the continuing Northwest Highway System bridge renewal program, contracts were awarded for new bridges over the streams at Koidern No. 2 and Jarvis

Creek on the Alaska Highway with culvert replacements at Spencer Creek, Young's Creek and George's Gorge. Contracts were also awarded for new bridges over the Kathleen, the Blanchard and Takhanne Rivers on the Haines Road as well as culvert replacements for Chuck and Nadahini Creeks. The completion of the Blanchard, Takhanne and Koidern No. 2, as well as the culvert replacement contracts, was delayed because of the lack of contractor performance and bankruptcy which will necessitate new contracts in 1970.

## **Plans for 1970**

### **B. Pacific Region**

On the Northern Roads Program being carried out for the Department of Indian Affairs and Northern Development, the grading contract will be completed from Mile 78 to Mile 123 on the Dempster Highway and the construction of a bridge spanning the Ogilvie River at Mile 123 is anticipated. The surfacing of the Campbell Highway from Carmacks to Ross River will be completed along with stockpiling of maintenance surfacing material along this section of the Highway. Surveys will be continued in preparation for extensions to the Northern Roads system not yet identified by priority.

On the Northwest Highway System, routine maintenance will continue. The British Columbia section will continue under contract. A fifth maintenance contract will be awarded to replace the contract to be completed March 31, 1970 from Mile 300 to Mile 496. Two surfacing contracts will be awarded for the sections from Mile 83.6 to Mile 158 and from Mile 148 to Mile 217. Reconstruction and asphalt paving of the Alaska Highway through the town of Fort Nelson will be completed by contract supervised by the Province of British Columbia.

The Department will award a contract for the application of base course, primer and asphaltic pavement on the Fort Nelson airport road, a distance of approximately 4.5 miles.

In the Yukon section, maintenance will again be carried out by departmental forces except for two crushing and surfacing contracts to be carried out, one from Mile 825 to Mile 885 and the other from Mile 885 to Mile 904 and from Mile 928 to Mile 968.

The contract will be completed for the realignment, grading and base course between Mile 904.5 and Mile 928.5 and a two-year contract will be awarded for the placing of base course, primer and asphaltic pavement from Mile 904.5 to Mile 928.5.

On the Northwest Highway System bridge renewal program, no new locations will be programmed but contracts to complete the defaulted contracts for Blanchard, Takhanne and Koidern No. 2 bridges and the Spencer, Young's, George's, Chuck and Nadahini culverts will be awarded.

Pre-engineering for this program will continue.

## Review of 1969 operations

### Western Region (Northwest Territories and Fort Churchill)

D.P.W. Activities Replacement of the National Harbours Board Waterline and construction of the first phase of the Water and Sewage System for Churchill were completed at a cost of \$976,000.

Various projects at Fort Churchill were carried out at a cost of \$150,000. These projects included painting office and living quarters, roofing repairs, alterations and additions to the Duke of Edinburgh School and highway improvements.

A \$330,000 contract was awarded for the construction of a 16-unit apartment at Inuvik to meet the requirements established by the Northern Housing Requirements Committee. Completion of this project is scheduled for latter 1970. Additional housing requirements at Hay River are being met through the acceptance of a build-lease proposal by an entrepreneur to provide an apartment building containing both married and single staff quarters. Four 3-bedroom houses were constructed in Fort Simpson to meet immediate pool housing needs at that location at a total cost of \$164,000.

Major repairs were carried out to the Federal Building at Yellowknife and interior alterations completed to provide improved facilities for the Department of Justice. Improved facilities were also provided for that Department at Hay River and Fort Smith.

The warehouse-garage complex at Hay River, including the provision for vehicle and trailer parking facilities, was completed.

Through the activities of four zone property managers and supporting staff, approximately 800 buildings were administered and maintained; these included residential, office and warehouse accommodation. Instructions were received that in excess of 300 units were to be made available, through transfer of title, to the Government of the Northwest Territories. The preliminary steps involved in this transfer were completed.

Various repair and improvement projects were undertaken during the course of the year, including exterior and interior painting at a cost in excess of \$100,000. A consulting service was provided to the RCMP, Ft. Smith Sub-division, in respect to the repair and upkeep of its buildings in the area.

Exceptionally low water conditions on the Athabasca-Mackenzie water system resulted in heavy demands on the Departmental dredging vessels. Channel improvements at the Sans Sault Rapids continued with the use of a rock breaker operating from a barge. While this operation proved feasible, progress was slow and action will be taken during 1970 to remove the rapids by blasting. Emergency dredging was carried out at various locations including the Athabasca River Delta, Norman Wells, Providence Ferry Crossing and other locations on the Mackenzie River. A channel access to the west of Hay River was provided for small fishing vessels. Survey work related to future projects also continued.

All structures serving the water transport industry on the Mackenzie River System were maintained and a program for upgrading facilities was continued. Steel floating units which will make up the public wharf at Wrigley were delivered and will be installed in 1970. The wharf at the head of the Great Bear River was reconstructed, and a contract was awarded for the construction of a replacement wharf at Ft. McPherson. Investigations and field surveys related to future facilities were carried out at various locations.

Activities for Other Government Departments. Various major projects which were commenced in the previous year on behalf of the Department of Indian Affairs and Northern Development were completed in 1969. Included in this category were the Children's Receiving Homes at Ft. Smith, Hay River and Inuvik; additions to the schools at Yellowknife and Pine Point, at total costs of \$770,000 and \$460,000 respectively; and the \$255,000 water distribution system at Coppermine. In addition, work on a \$460,000 addition to the Baker Lake School, involving two standard classrooms and a gymnasium, commenced in 1969 with completion scheduled for September 1970.

Contracts valued at \$250,000 and \$292,500 were awarded for the construction of new nursing stations at Rankin Inlet and Gjoa Haven respectively. The former was completed in January 1970 and the latter is scheduled for completion by March 1970.

The construction of a new \$500,000 Administration Building in Yellowknife to serve the Ft. Smith Sub-division of the RCMP was well advanced by the end of the year. Other projects in the RCMP northern program include preconstructed cell cabins for Cambridge Bay, Coppermine, Ft. McPherson and Rankin Inlet; and garage-warehouse structures at Coppermine, Ft. Good Hope, Ft. Liard and Rankin Inlet; all of which were completed at a total cost of approximately \$90,000.

In addition, alterations costing \$35,000 were made to the RCMP Detachment Quarters at Churchill and the living quarters at Sachs Harbour was repaired and modernized at a cost of \$35,500 to provide accommodation for the married staff. Minor projects were also carried out at various other locations.

The northern roads program for Department of Indian Affairs and Northern Development included the near completion of the Mackenzie Highway extension from Mile 167 to Mile 229; good progress on the 2.7 million dollar contract awarded in 1969 for the completion of the Mackenzie Highway to Ft. Simpson (Mile 229 - 296); and completion of the revisions to the airport and related roads at Yellowknife at a final cost of \$622,000. A \$630,000 contract for crushed gravel surfacing and stockpiling was awarded and completed in effecting improvements to Mile 36 to Mile 166 on the Ft. Smith Highway and approximately 2 miles of Mackenzie Drive, Hay River.

Work related to the future road program included aerial photography and mapping, relocation surveys and other field investigations. Surveys were carried out on the proposed route from Ft. Simpson towards Ft. Liard, which will ultimately extend to the B.C. Boundary and connect with the Provincial Road from Ft. Nelson. Also undertaken were essential field location surveys of a proposed road from Ft. McPherson to Inuvik, which is part of a planned network connecting the Mackenzie River Delta settlements to the Dempster Highway.

Other work related to the northern road system included the completion of modifications to the ferry at the Providence Crossing of the Mackenzie River and the design of a proposed new ferry of larger capacity for this location.

Surveys and construction of recreational and camping areas were undertaken for the Government of the Northwest Territories at several locations. Final expenditures were in the order of \$200,000.

### **Plans for 1970**

#### **D.P.W. Activities**

The 16 unit apartment building at Inuvik will be completed and placed in service and additional northern housing units will be constructed where and as required to meet any needs that may be identified during the year. Interior alterations will be undertaken in the federal buildings at Ft. Simpson and Yellowknife to accommodate tenant departments. In addition, administration and maintenance of all federal buildings in the Northwest Territories will be continued.

The program of improvements for navigation on the Mackenzie River will be accelerated to keep pace with the increasing freight traffic resulting from the recent developments related to the oil industry. The present bottleneck at Sans Sault Rapids will be eliminated by means of separate contracts for drilling and blasting the bedrock areas within the limits of the proposed channel and for dredging the shattered rock and gravel. Departmental dredging will be carried out at other critical areas on the Mackenzie River. Extensive studies, field surveys and design work will be undertaken in connection with possible future harbour facilities at Norman Wells, Inuvik, Cambridge Bay and Herschel Island.

#### **Activities on Behalf of Other Government Departments**

The RCMP Administration Building at Yellowknife will be completed. New detachment quarters will be provided in Ft. McPherson, cell cabins constructed for Coppermine and Tuktoyuktuk and a garage-warehouse provided at Igloodik.

A new nursing station for the Department of National Health and Welfare will be built at Ft. Resolution at a cost of approximately \$200,000, and the foundations constructed for a similar facility at Ft. McPherson, with construction of the unit scheduled for 1971. The school addition at Baker Lake for the Department of Indian Affairs and Northern Development will be completed.

Under the program to be undertaken for the Department of Indian Affairs and Northern Development, the Mackenzie Highway will be completed to Ft. Simpson. A two-year contract at an estimated cost of \$3,000,000 will be awarded for the construction of 67 miles of the new highway extending from the Mackenzie Highway near Ft. Simpson towards Ft. Liard. Engineering and location surveys will be carried out for the planned future extension of this route.

A contract for the aerial photography and mapping of a possible future road location from Edzo to Coppermine will be completed.

The field surveys and design for the projected Ft. McPherson-Arctic Red River-Inuvik road will be completed. Right-of-way clearing for 30 miles at each end of this route will be carried out under contract.

## DEPARTMENT OF PUBLIC WORKS

### QUEBEC REGION

#### Responsibilities

The Department has been requested by other departments and agencies to prepare plans, and to supervise the construction of a number of installations at various locations in the North, in addition to projects initiated by our own Department.

#### Review of 1969 Operations

##### Public Works Activities

**Great Whale River (Poste de la Baleine)** This is a wharf extension project started in 1967 and continued in 1969, in support of the water transport industry to provide an essential service to this isolated community for the transportation of goods. This project is at standstill pending approval of new design at an increased cost. An amount of \$10,000 will be spent during 1969, mainly in materials.

##### Activities Carried Out for Other Departments

###### Indian Affairs and Northern Development

**Pangnirtung** – This construction project which was started in 1968, comprises two standard classrooms, a gymnasium, and other related installations. These facilities were completed in 1969 at a total cost of approximately \$950,000.

**Cape Dorset** – This construction project which was started in 1969, comprises four standard classrooms, a library, gymnasium and other related facilities. This installation should be in service by September 1970. The total estimated cost is approximately \$1,100,000.

**Frobisher Bay** – The construction of an academic school with 24 classrooms, three laboratories and other related installations, started in 1969 and should be completed by September 1971 at a total cost of approximately \$3,250,000.

#### Plans for 1970

##### Department of Indian Affairs and Northern Development

**Frobisher Bay.** Continuation of the construction of the academic vocational school started in 1969 and starting on the new construction of a children's reception home (T.E.C. \$170,000.).

**Cape Dorset.** Continuation and completion of the school addition started in 1969.

##### Royal Canadian Mounted Police

**Pangnirtung.** Sewage disposal system installation for married quarters. \$7,000.

\*Subject to Program approval

*Iglolik.* Construction of warehouse/workshop. \$15,000.

*Lake Harbour.* Installation of sewage disposal system for married quarters. \$7,000.

*Pond Inlet.* Repairs to married quarters installation. \$2,000.

**Department of National Health and Welfare**

*Broughton Island* — Construction of a new nursing station consisting of a one storey building 52 by 80 feet at an estimated cost of \$245,000.

*Clyde River* — Construction of a new nursing station at an estimated cost of \$245,000. Construction will consist of a one storey building 52 by 80 feet.

**DEPARTMENT OF TRANSPORT**

## DEPARTMENT OF TRANSPORT

### AIR SERVICES

#### AIRPORTS AND FIELD OPERATIONS BRANCH

##### Responsibilities

The operation and maintenance of airports owned by the Department of Transport in the North.

##### Long-Term Plans

To anticipate and provide for the future needs of Airports and Field Operations in the North consistent with the growth of aviation and northern development.

##### Review of 1969 Operations

##### Plans for 1970

##### Baker Lake, Northwest Territories

Upgrading runways, parking ramp and access roads

continuing improvement

##### Cambridge Bay, Northwest Territories

Fire alarm system

to be completed

##### Coral Harbour, Northwest Territories

Sewage system, water reservoir and water lines

to be completed

##### Fort McMurray, Alberta

Fire alarm system

Install emergency power

to be completed

##### Fort Nelson, British Columbia

Extension to operations building

##### Frobisher Bay, Northwest Territories

Renew runway lighting

Modifications to Building T-66

Modifications to baggage system

to be completed

##### Fort Chimo, Quebec

Construct double dwelling

Repave runway 14-32

Relocate power/control lines

Extend equipment garage

to be completed

### **Fort Simpson, Northwest Territories**

Install emergency Power

extend operations  
building  
construct airport  
road

### **Fort Smith, Northwest Territories**

Air terminal building completed.

### **Hay River, Northwest Territories**

Construct field electrical centre  
Construct maintenance garage  
Construct terminal/operations building  
Improvements to power lines  
Improvements to building area

to be completed

### **Inuvik, Northwest Territories**

Electrical outlets for aircraft parking

emergency power unit

### **Norman Wells, Northwest Territories**

Emergency power installed  
Pave access road and building area.

### **Resolute Bay, Northwest Territories**

Construct warehouse building for cargo  
Fire alarm facilities  
Construct second runway (150X4000 gravel)

to be completed  
to be completed  
Runway and approach  
lighting

### **Schefferville, Quebec**

Repave runway 08-26  
Fence airport boundary

to be completed

### **Watson Lake, Yukon Territories**

Maintenance garage, firehall and  
sand storage building  
Emergency power plant and building

to be completed

### **Yellowknife, Northwest Territories**

Emergency power unit.

### **General**

Equipment such as trucks, sweepers, blowers  
and fire protection equipment not separately  
enumerated.

## DEPARTMENT OF TRANSPORT

### CIVIL AVIATION BRANCH

#### Development of Airways and Air Routes

During 1969, low level air routes have been established from Komakuk to Cape Dyer with feeder routes to Inuvik, Coppermine, Baker Lake, Coral Harbour and Frobisher Bay. In the depiction of these air routes, existing military and civil non-directional beacons were utilized. High level airways to serve the new jet aircraft were established to link Whitehorse, Inuvik and Yellowknife to the airway system in the South.

#### Coppermine, Northwest Territories

As part of the joint DIAND/DOT program for the development of airstrips in the far North, the amount of \$52,412 in DOT funds were expended for runway construction at Coppermine during 1969.

#### Review of 1969 Operations

##### Projects Completed

Location	Project	Total Cost
Igloodik	Non-directional Beacon	\$ 16,400
Repulse Bay	Non-directional Beacon	16,200
Spence Bay	Non-directional Beacon	18,000
Fort Smith	Abbreviated VASIS	18,000
Hay River	Runway lighting	45,000
	Abbreviated VASIS	18,600
Inuvik	Pave runway, apron and taxiway	1,186,000
Norman Wells	Pave runway, apron and taxiway	1,100,000
Watson Lake	Non-directional Beacon and VHF Communications	81,200
Yellowknife	Instrument Landing System	177,000

##### Projects commenced

Location	Project	Total Cost	Degree of Completion
Baker Lake	Lengthen and improve airstrip	\$180,000	started
Resolute Bay	Second runway	322,000	50 per cent
Hay River	Instrument Landing System	223,100	80 per cent

Inuvik	Glide Path and Middle Marker	70,600	95 per cent
Yellowknife	Abbreviated VASIS	24,600	90 per cent

### **Area Control in the Polar Region of Canada**

A substantial increase in international air traffic flying on Polar routes between Europe and Alaska was experienced in 1969. Canadian Air Traffic Control has the responsibility to provide a service to these flights while traversing the northern area of Canada. In the interest of flight safety, planning took place in 1969 to redesignate the present Flight Information Region over this area as controlled airspace so as to provide an Area Control Service to these flights from the 72nd degree of north latitude to the North Geographic Pole. This ATC service will be provided, commencing the summer of 1970, to all aircraft occupying the high altitude airspace from Flight Level 290 and upwards.

Additional air-ground radio frequencies were commissioned at Cambridge Bay, Northwest Territories, as the primary communications station within a radio network serving this area.

### **Northern Control Area**

To accommodate air traffic flying between Europe and western North America, co-ordination and planning was carried out to establish a system of preferred tracks in the Northern Control Area of Canada. This will allow ATC to organize this traffic on a planning basis and thus provide for better airspace utilization.

### **Inuvik, Northwest Territories**

With scheduled air carrier jet operation into Inuvik the ATC telephone network was extended from the Edmonton Area Control Centre to Inuvik via leased commercial landline. This interphone circuit also provides the Centre with a telephone capability into intermediate stations along the Mackenzie River.

### **Labrador City, Newfoundland**

A new airport control tower building was opened at the Wabush Aerodrome in August, 1969.

### **Whitehorse, Yukon Territory**

ATC continued to provide an Airport Control Tower service at Whitehorse during 1969.

### **Goose Bay, Newfoundland**

ATC maintained an enroute radar facility at Goose Bay, Newfoundland during 1969, in order that the local military radar installation could be used to assist in the movement of aircraft.

## DEPARTMENT OF TRANSPORT

### MARINE SERVICES

#### MARINE OPERATIONS BRANCH

##### Responsibilities

To carry out and co-ordinate the delivery of cargo and passengers for the Canadian Government, United States Air Force and commercial concerns; to provide ice-breaker escort and related assistance as required; to conduct oceanographic and hydrographic surveys; to provide search and rescue services as required and to undertake special assignments assisting research and development projects.

##### Long-Term Plans

To continue to meet increasing demands in support of Arctic navigation and in the movement of cargo and passengers.

#### EASTERN ARCTIC

##### Review of 1969 Operations

The resupply of Resolute Bay and the Joint Arctic Weather Stations was carried out by using two dry-cargo vessels and four tankers, supported by icebreakers. The resupply of Eureka and sites further north was accomplished by the CCGS *d'Iberville*. The M.V. *Chesley A. Crosbie*, a commercial vessel, carried supplies to the vicinity of Eureka for Panarctic Oils and was escorted inward and outward by the CCGS *d'Iberville*.

Icebreaker assistance by the CCGS *Labrador* was also provided to Panarctic's sea-lift to Rea Point. However, due to severe ice conditions, both barges were lost in transit.

The CCGS *N.B. McLean* and CCGS *Montcalm* provided assistance to vessels in the Hudson Bay area for exploration work on behalf of the Aquitaine Company.

Oceanographic and hydrographic assistance was also provided to the Department of Energy, Mines and Resources in various areas of the Eastern Arctic.

During September and October the CCGS *John A. Macdonald* accompanied and gave continual icebreaker support to the S.S. *Manhattan* throughout her trials in the Arctic and her transit of the Northwest Passage to Point Barrow, Alaska and return. On the return passage, late in the season, assistance was also given by the CCGS *Louis St. Laurent*.

The Department arranged for and provided twelve Coast Guard vessels, four dry-cargo vessels, seven oil tankers and ten other commercial vessels which carried cargo on a rate per ton basis.

Approximately 117,000 short tons of general cargo and bulk oil were transported and handled in the Arctic in 1969. A breakdown of the tonnage handled by the various vessels follows.

## Plans for 1970

It is expected that additional assistance by icebreakers will be required for scientific groups and exploration companies. The usual icebreaker assistance for the Arctic resupply operation will again be provided.

### WESTERN ARCTIC

#### Review of 1969 Operations

The CCGS *Camsell*, a 224-foot icebreaker with gross tonnage of 2,022 tons and 4,250 shaft horse-power, has been assigned to the western Arctic each year since 1960 to assist in Northern resupply. The 10-year average date for departure from Victoria has been June 29th and the average arrival date at Demarkation Point by way of Point Barrow has been July 25th.

In 1969, the heaviest ice concentration east of Tuktoyaktuk along the shipping route was found between Clinton Point and Lady Franklin Point where icebreaking escort was necessary until August 5th. Thereafter, the shipping route remained clear or open packed and icebreaker support was not required up to the time the vessel departed on September 11th. The *Camsell* had 260 hours of escort time in 1969 and over the 10-year period has spent 2,275 hours in escort.

Approximately 1,200 miles of track soundings were carried out in 1969 with the majority of these in unsounded waters. The work was carried out by two hydrographers assigned to the *Camsell*. The hydrographers also assisted the ships' officers with the location of aids to navigation.

From time to time the vessel, helicopter and doctor are called upon to render assistance in emergency situations. In 1969 the vessel was advised of a downed aircraft in the vicinity of Point Barrow on July 15th. The *Camsell's* helicopter was dispatched to search the area and after locating the three persons from the downed aircraft, it was able to fly them to Point Barrow.

The ship's doctor visited a number of Eskimo villages to give medical advice and attention. He also visited nursing stations at Coppermine, Cambridge Bay and Spence Bay.

The vessel assisted the Government of the Northwest Territories by picking up approximately 8 tons of whalebone at Fort Ross, on the eastern side of Somerset Island, for delivery to Spence Bay for use in native craft work. Because of ice conditions in Bellot Strait it was necessary for the vessel to make the passage from west to east and return through the Northwest Passage north of Somerset Island.

The vessel also assisted the United States Naval Undersea Research Development buoy program at Jesse Harbour.

On her return to Victoria, the *Camsell* escorted Northern Transportation Company Ltd. LST No. 602 from Prudhoe Bay to Seattle.

## **Plans for 1970**

It is proposed to assign the CCGS *Camsell* to the western Arctic for the period July 1st to October 1st, approximately, to carry out responsibilities similar to those assigned in previous years.

## **MARINE WORKS BRANCH**

### **Responsibilities**

The provision and servicing of all marine aids to navigation in the Arctic.

### **Long-Term Plans**

The continuing assessment of aids to navigation in the Arctic in light of new traffic and new traffic patterns.

### **Review of 1969 Operations**

New buildings were constructed to house the Marine Agency at Hay River in 1968 and in 1969 a wharf was constructed at an approximate cost of \$100,000 to complete this service facility.

The first shore-based marine transponder to be used in Canada was placed at Tuktoyaktuk and provides positive identification on ships' radar up to 30 miles away.

Twenty-one new aids to navigation were constructed in the Great Bear Lake area to mark channels and facilitate the movement of traffic in this area. This work was accomplished in 6 weeks with the assistance of a DOT helicopter which was stationed for the season at Hay River.

The aids to navigation operation and maintenance costs for 1969 were \$560,000. Aids to navigation capital costs for the past year were \$308,680. These figures give a combined cost of \$868,680 for aids to navigation services in the Arctic during 1969.

The Aids to Navigation Division of this Branch is responsible for approximately 350 marine aids to navigation in Arctic waters. The buoys that are used in the Arctic are replaced on an annual basis due to the severe ice conditions.

## **Plans for 1970**

With the marked success of the transponder at Tuktoyaktuk it is proposed to install four more in the area to provide positive radar identification to the approaches to Tuktoyaktuk and the North Shore. The capital program for the Mackenzie River system amounts to about \$200,000 for the coming year and these funds will provide improvements and new aids structures and equipment at various places on the river. Operation and maintenance costs are estimated at \$584,436 for 1970. The existing aids to navigation for both the Eastern and Western Arctic will be maintained and serviced and new aids will be provided as justified by summer traffic.

## MARINE REGULATIONS BRANCH

### Responsibilities

To provide Port Warden services in the loading of grain cargoes at Churchill and to provide pilotage service at Churchill and Goose Bay.

### Long-Term Plans

To continue to provide these services compatible with the activities at the port of Churchill and Goose Bay and to provide similar services to other Arctic ports as warranted by traffic and other developments.

### Review of 1969 Operations

At Churchill surveys were undertaken of 28 vessels each of which loaded a full cargo of grain amounting in total to 586,376 long tons. These vessels consisted of 20 bulk carriers, six tankers and two conventional tween-deck ships.

Pilotage services were rendered on 105 occasions at Churchill and 45 occasions at Goose Bay during the 1969 season.

### Plans for 1970

Two officers will be dispatched to each port prior to the opening of the navigation season to again provide services outlined above.

### Statement of Tonnages Shipped to the East/West Arctic During 1969

Vessel	From	To	Weight (lbs.)
CCGS <i>Eider</i>	Montreal	Battle Harbour	532,713
	"	Fort Chimo	24,853
	"	Igloolik	2,718
	"	Hall Beach	663
	"	Cartwright	14,579
M.V. <i>White Rose</i>		Fort Chimo	5,234,000
Churchill		Hall Beach	67,372
"		Igloolik	126,575
"		Repulse Bay	56,962
"		Povungnituk	22,290
"		Coral Harbour	171,853
Igloolik		Churchill	10,000
Coral Harbour		Churchill	750
Repulse Bay		Churchill	13,890
M.V. <i>Maplebranch</i>		Igloolik	3,116,000
"	"	Hall Beach	861,000
"	"	Repulse Bay	713,400
"	"	Coral Harbour	2,829,000
Hall Beach		Rowley Islands	1,336,600

Rowley Islands	Longstaff	1,722,000
Goose Bay	Resolution	24,577
Resolution	Cartwright	32,900
Goose Bay	Cartwright	206
Povungnituk	Quebec	290
Coral Harbour	Quebec	15,000
Fort Chimo	Koartak	4,000
CCGS <i>Montcalm</i>	Pangnirtung	1,755
Igloolik	Pangnirtung	24,000
CCGS <i>Gilbert</i>	Povungnituk	19,600
Goose Bay	Saglek	31,190

17,010,736  
8,505.1  
(short tons)

CCGS <i>Puffin</i>	Montreal	Cape Hope's Advance	96,699
	"	Lake Harbour	158,040
	"	Nottingham Island	153,071
	"	Povungnituk	4,298
	"	Port Harrison	9,293
	"	Baker Lake	1,094
	"	Wakeham Bay	18,110
	"	Great Whale River	2,307
	Churchill	Eskimo Point	2,112,057
	"	Whale Cove	54,000
	Montreal	Churchill	10,000
	Churchill	Povungnituk	4,299
	"	Port Harrison	20,077
	"	Nottingham Island	253,146
	"	Great Whale River	2,307
	"	Baker Lake	175,761
	"	Whale Cove	984,000
	"	Rankin Inlet	113,077
	Rankin Inlet	Churchill	1,280
	Churchill	Sugluk	8,619
	"	Cape Hope's Advance	1,075
	"	Port Burwell	821
	"	Wakeham Bay	789
	"	Ivugivik	300
	"	Sugluk	52
	Port Burwell	Quebec	11,988
	Port Harrison	Povungnituk	2,950
	Sugluk	Payne Bay	8,000
	"	Quebec	2,220
	Wakeham Bay	Quebec	4,373
	Payne Bay	Quebec	2,010
	Baker Lake	Churchill	100
	Rankin Inlet	Baker Lake	3,500

Vessel	From	To	Weight (lbs)
	M.V. <i>Maplebranch</i>	Rankin Inlet	4,124,600
	" "	Baker Lake	2,542,000
	" "	Chesterfield Inlet	1,984,400
			12,870,713
			6,435.3
			(short tons)
CCGS <i>Raven</i>	Montreal	Cape Dorset	35,625
	"	Coral Harbour	8,500
	"	Ship	24,000
	Churchill	Fort George	2,056,600
	"	Great Whale River	2,323
	"	Belcher Islands	13,696
	Coral Harbour	Churchill	14,000
	Great Whale River	Churchill	12,461
	Belcher Islands	Churchill	750
	Churchill	Whale Cove	286,768
	"	Eskimo Point	1,127,713
	Eskimo Point	Churchill	1,950
	Whale Cove	Churchill	11,125
	Churchill	Port Harrison	5,855
	"	Winisk	49,890
	"	Quebec	123,100
	Port Harrison	Quebec	12,331
	Great Whale River	Whale Cove	3,625
	"	Rankin Inlet	750
	"	Belcher Islands	16,000
	M.V. <i>Imperial Acadia</i>	Great Whale River	7,386,000
			11,193,062
			5,596.5
			(short tons)
CCGS <i>Skua</i>	Goose Bay	Saglek	174,326
	Saglek	Resolution Island	2,000
	"	Goose Bay	141,110
	M.V. <i>Maplebranch</i>	Pangnirtung	1,501,755
	M.V. <i>Jos Simard</i>	Broughton Island	1,148,000
	" "	Pond Inlet	2,132,000
	M.V. <i>Elias L.</i>	Frobisher Bay	1,800,000
	Montreal	Clyde River	140,000
	"	Pangnirtung	36,000
	"	Baffin Sites	100,108
	"	Hopedale	104,574
	Frobisher Bay	Resolution Island	1,574
	Coral Harbour	Port Burwell	400
	Broughton Island	CCGS MONTCALM	1,200
	"	Arctic Bay (via Pond Inlet)	40,000
	"	Grise Fiord (via Pond Inlet)	7,000

Vessel	From	To	Weight (lbs.)	
	Pangnirtung	Broughton Island	12,550	
	"	Clyde River	80,000	
	Montreal	Rowley Island	41,285	
	"	Langstaff	55,464	
	Goose Bay	Resolution Island	54,932	
	Pangnirtung	Pond Inlet	1,000	
	CCGS <i>Montcalm</i>	Pangnirtung	3,755	
	Resolution Island	Goose Bay	1,000	
	Pangnirtung	Halifax	1,930	
	Montreal	Baffin/Foxe Sites	150,000	
				7,731,963
				3,865.9
				(short tons)
Total Cargo Carried or Handled by Northern Service Vessels				24,402.8
CCGS <i>d'Iberville</i>	Montreal	Ship	455	
	"	Saglek	16,648	
	"	Alert	3,939	
	"	Resolute Bay	23,679	
	"	Clyde River	7,026	
	"	Broughton Island	6,985	
	"	Greely Fiord	46,508	
	"	Eureka	805,486	
	"	Isachsen	6,315	
	"	Mould Bay	6,941	
	"	Pangnirtung	5,549	
	"	Grise Fiord	347,446	
	"	Cape Sparbo	4,569	
	"	Tanquary Fiord	83,636	
	Pond Inlet	Grise Fiord	2,500	
	Greely Fiord	Quebec	250	
	Grise Fiord	Quebec	17,970	
	Eureka	Quebec	1,660	
	Cape Sparbo	Quebec	2,500	
	Resolute Bay	Grise Fiord	32,993	
	"	Eureka	225,000	
	Clyde River	Arctic Bay	900	
	Pond Inlet	Arctic Bay	45,000	
	Arctic Bay	Pangnirtung	566	
	Pond Inlet	Pangnirtung	5,300	
				1,699,821
				849.9
				(short tons)
CCGS <i>John A Macdonald</i>	Montreal	Alert	1,024,563	
				1,024,563
				512.3
				(short tons)

CCGS <i>Narwhal</i>	Halifax	Clyde River	3,620	
	d'Iberville	Saglek	16,640	
				20,260
				10.1
				(short tons)
CCGS <i>N.B.</i>				
<i>McLean</i>	Montreal	Makkovik	13,305	
	"	Koartak	8,616	
	"	Wakeham Bay	38,991	
	"	Sugluk	121,276	
	"	Churchill	5,660	
	"	Resolute Bay	10,652	
	"	Vessel	23,555	
	Churchill	Frobisher Bay	1,400	
	"	Grise Fiord	350	
	"	Clyde River	350	
	"	Pond Inlet	4,746	
	"	Resolute Bay	590	
	Sugluk	Churchill	530	
	Churchill	Chesterfield Inlet	57,094	
	Clyde River	Churchill	3,000	
	Arctic Bay	Churchill	500	
	Churchill	Port Burwell	2,034	
	"	Coral Harbour	3,341	
	"	Cape Dorset	9,945	
				305,935
				152.9
				(short tons)
CCGS <i>Montcalm</i>	Montreal	Hall Beach	66,663	
	"	CAM 4	4,232	
	"	Cape Dyer	45,967	
	"	Fox 3	3,772	
	"	CAM 5	3,967	
	"	Resolution Island	3,717	
	"	Fox 4	4,879	
	"	Fox 5	4,947	
	"	Clyde River	36,400	
	"	Vessel	15,840	
	CCGS <i>Skua</i>	Churchill	250	
	Churchill	Igloolik	24,740	
	"	Repulse Bay	28,490	
	"	Pangnirtung	1,130	
	<i>S.S. Federal Pioneer</i>	Longstaff Bluff	30,338	
	CCGS <i>Skua</i>	Rowley Island	41,285	
	"	Longstaff Bluff	55,464	
	Longstaff Bluff	Fox 2	3,125	
	"	Quebec	30	
	Nottingham Island	Quebec	56,845	

Vessel	From	To	Weight (lbs.)	
	Ekalugad	Quebec	2,000	
				434,081
				217.0
				(short tons)
CCGS <i>Sir</i>				
<i>Humphrey</i>				
<i>Gilbert</i>	Churchill	Whale Cove	129,567	
	"	Chesterfield Inlet	61,424	
	"	Rankin Inlet	24,900	
	"	Igloolik	354,170	
	"	Repulse Bay	94,338	
	"	Hall Beach	38,661	
	Repulse Bay	Churchill	18,630	
	Churchill	Cape Dorset	243,489	
	"	Lake Harbour	62,686	
	"	Rankin Inlet	48,374	
	"	Povungnituk	19,600	
	Lake Harbour	St. John's, Nfld.	1,740	
	Cape Dorset	St. John's	1,238	
	Igloolik	Repulse Bay	150,000	
	Hall Beach	Igloolik	38,320	
	"	Rowley Island	5,354	
				1,292,491
				646.2
				(short tons)
Total Cargo Carried or Handled by C.C.G.S. Icebreakers				2,388.4
				(short tons)
M.V. <i>Ardgarvel</i>	Churchill	Baker Lake	446,107	
	Baker Lake	Churchill	18,400	
				464,507
				232.3
				(short tons)
S.S. <i>Blue Peter</i>	Montreal	Frobisher Bay	40,010	
				40,010
				20
				(short tons)
M.V. <i>Cabateal</i>	Montreal	Strathcona Sound	52,500	
	"	Ship	125,605	
	"	Resolute Bay	1,616,622	
	"	Eureka	185,002	
	"	Arctic Bay	510,573	
	"	Mould Bay	234,103	
	"	Isachsen	79,591	
	"	Alert	16,689	
	"	Pond Inlet	151,525	
	"	Clyde River	2,030,130	

Vessel	From	To	Weight (lbs.)
	Resolute Bay	Montreal	201,511
	Frobisher Bay	"	186,789
	Clyde River	"	75,163
	Arctic Bay	"	2,800
	Pond Inlet	"	8,825
			5,477,428
			2,738.7
			(short tons)
M.V. <i>Cacouna</i>	Montreal	Baker Lake	943,864
	"	Fort Chimo	189,098
	Fort Chimo	Montreal	800
	Montreal	Goose Bay	73,060
	Baker Lake	Montreal	115,390
			1,322,212
			661.1
			(short tons)
M.V. <i>Chesley A. Crosbie</i>	Montreal	Frobisher Bay	68,884
	Frobisher Bay	Montreal	128,093
	Montreal	Goose Bay	11,072
	Goose Bay	Montreal	24,000
			232,049
			116.0
			(short tons)
M.V. <i>Andrew C. Crosbie</i>	Montreal	Great Whale River	387,626
	"	Payne Bay	81,952
	"	Port Burwell	590
	"	Lake Harbour	2,975
	"	Koartak	500
	"	Wakeham Bay	9,590
	"	Cape Dorset	2,035
	"	Sugluk	1,100
	"	Povungnituk	341,228
	"	Port Harrison	5,020
	"	Belcher Islands	498,802
	Povungnituk	Montreal	6,410
	Port Harrison	"	37,665
	Great Whale River	"	38,415
	Montreal	Frobisher Bay	6,100
	Frobisher Bay	Montreal	900
			1,420,908
			710.5
			(short tons)
M.V. <i>Sir John Crosbie</i>	Montreal	Saglek	71,668
	"	Resolution Island	9,511
	"	Ship	221,400

		“	Coral Harbour	316,880	
		“	Cape Dorset	1,426,383	
		“	Povungnituk	292,311	
		“	Pond Inlet	3,673	
		“	Whale Cove	683	
		“	Ivugivik	172	
		“	Pangnirtung	566	
		“	Igloolik	500	
		“	Pond Inlet	246,054	
		“	Arctic Bay	287,965	
		“	Grise Fiord	25,525	
		“	Strathcona	624,308	
		“	Clyde River	30,360	
		“	Mould Bay	100	
		“	Resolute Bay	129,434	
		“	Goose Bay	44,058	
	Coral Harbour		Montreal	82,786	
	Cape Dorset		“	1,400	
	Goose Bay		“	2,220	
					3,817,957
					1,908.9
					(short tons)
<i>S.S. Chemical Transport</i>	Montreal		Resolute Bay	15,423,648	15,423,648
					7,711.8
					(short tons)
<i>M.V. Clyde</i>	Montreal		Fort Chimo	382,142	
	“		Goose Bay	58,931	
					441,073
					220.5
					(short tons)
<i>M.V. Domino Run</i>	Montreal		Goose Bay	202,876	
					202,876
					101.4
					(short tons)
<i>M.V. Elias L.</i>	Montreal		Frobisher Bay	1,069,697	
					1,069,697
					534.8
					(short tons)
<i>S.S. Federal Pioneer</i>	Montreal		Pangnirtung	859,688	
	“		Resolution Island	149,968	
	“		Clyde River	430,990	
	“		Broughton Island	1,023,289	
	“		Hall Beach	640,565	
	“		Igloolik	876,754	

Vessel	From	To	Weight (lbs.)	
	"	Repulse Bay	694,384	
	"	Cape Dyer	520,542	
	"	Cape Christian	78,899	
	"	Cape Hooper	24,217	
	"	Longstaff Bluff	34,942	
	"	Inugsuin Fiord	75,422	
	"	Ship	1,717,448	
	"	Saglek	317,766	
	"	REX — X — 1	47,263	
	"	CAM—4	50,339	
	"	CAM—5	41,350	
	"	Hall Beach	443,397	
	"	FOX 4	114,055	
	Igloodik	Montreal	24,766	
	Inugsuin Fiord	"	775	
	Repulse Bay	"	6,780	
	Pangnirtung	"	23,517	
	Hall Beach	"	50,885	
	Clyde River	"	9,265	
	Broughton Island	"	15,684	
	FOX 4	"	1,375	
	Brevoort Island	"	1,048	
	Longstaff Bluff	"	1,890	
	Cape Christian	"	6,311	
	Cape Dyer	"	15,000	
	Ship	"	150,200	
			8,439,774	
			4,219.8	
			(short tons)	
M.V. <i>Fort Lauzon</i>	Montreal	Resolute Bay	1,340,729	1,340,729
				670.3
				(short tons)
M.V. <i>Edouard Simard</i>	Montreal	Arctic Bay	3,096,200	
	"	Pond Inlet	2,132,000	
	"	Grise Fiord	1,188,000	
	"	Resolute Bay	23,466,553	
			29,882,753	
			14,941.3	
			(short tons)	
M.V. <i>Jos. Simard</i>	Montreal	Baffin/DEW Sites	11,803,433	
	Goose Bay	Basin Sites	14,144,000	
			25,947,433	
			12,973.7	
			(short tons)	

Vessel	From	To	Weight (lbs.)	
<i>M.V. Irving</i>				
<i>Ours Polaire</i>	Montreal	Resolute Bay	13,587,482	13,587,482
				6,793.7
				(short tons)
<i>M.V.</i>				
<i>Maplebranch</i>	Montreal	Rankin Inlet	1,926,400	
	Churchill	Rankin Inlet	1,804,000	
	"	Baker Lake	4,674,000	
	"	Chesterfield Inlet	1,968,008	
	"	Hall Beach	861,000	
	"	Repulse Bay	713,400	
	"	Igloolik	3,116,000	
	"	Coral Harbour	2,829,000	
	"	Pangnirtung	1,476,000	19,367,808
				9,683.9
				(short tons)
<i>M.V. Thessaly</i>	Resolute Bay	Montreal	77,064	77,064
				38.5
				(short tons)
<i>M.V. Topsail</i>				
<i>Star</i>	Montreal	Frobisher Bay	7,629	
	"	Goose Bay	9,940	
	Frobisher Bay	Montreal	37,201	
	George River	"	2,100	56,870
				28.4
				(short tons)
<i>M.V. Theokrates</i>	Montreal	Ship	135,059	
	"	Port Burwell	247,970	
	"	Cape Dorset	357,945	
	"	Ivugivik	229,660	
	"	Port Harrison	365,013	
	"	Eskimo Point	343,708	
	"	Whale Cove	197,712	
	"	Rankin Inlet	591,026	
	"	Chesterfield Inlet	221,003	
	"	Coral Harbour	801,838	
	Coral Harbour	Montreal	118,250	
	Port Burwell	"	7,560	
	Cape Dorset	"	3,675	
	Ivugivik	"	1,080	
	Chesterfield Inlet	"	23,480	
	Port Harrison	"	32,294	

	Rankin Inlet	“	980	
				3,678,353
				1,839.1
				(short tons)
Hudson Bay				
Transport				
Barge Rupert				
River	Rupert House	Moose Factory	400	
<i>M.V. Twillingate</i>	Churchill	Rankin Inlet	10,655	
	“	Eskimo Point	2,384	
	“	Chesterfield Inlet	233	
	“	Baker Lake	1,220	
	Eskimo Point	Churchill	700	
Barge Churchill				
River	Moosonee	Fort George	389	
	“	Povungnituk	50	
	“	Port Harrison	200	
	“	Fort Albany	9,890	
	“	North Belchers	10,000	
	“	Paint Hills	36	
	“	Great Whale River	40	
Barge Nelson				
River	Moosonee	Rupert House	2,527	
	“	East Main	166	
	“	Fort Albany	285	
	“	Paint Hills	166	
<i>M.V. Pierre</i>				
<i>Radisson</i>	Frobisher Bay	Clyde River	18,000	
	Port Harrison	Montreal	2,451	
	Pangnirtung	“	1,721	
				61,513
				30.7
				(short tons)
Total Cargo Carried or Handled by Chartered or Rate per Ton Vessels				66,175.4
				(short tons)
Northern Transportation Company			14,390,400	
				7,195.2
				(short tons)
Goose Bay Operation			19,602,200	
				9,801.1
				(short tons)
Frobisher Bay Operation			14,198,800	
				7,099.4
				(short tons)

# Recapitulation

Northern Service Vessels	24,402.8
CCGS Icebreakers	2,388.4
Chartered & Rate per Ton Vessels	66,175.4
Northern Transportation Co. (Western Arctic)	7,195.2
Goose Bay Operation	9,801.1
Frobisher Bay Operation	7,099.4
Total	117,062.3
	(short tons)

## DEPARTMENT OF TRANSPORT

### METEOROLOGICAL BRANCH

#### Responsibilities

Provision of meteorological facilities and services to meet approved requirements; research necessary to support these services and to increase understanding of the weather processes and climate of northern Canada; obtaining of meteorological reports from ships in northern waters; ice reconnaissance; the provision of weather forecasts and weather advisory service; ice forecasting and ice advisory service for the navigable waters of the North. Operation of thirteen upper air stations in the North and, jointly with the United States Weather Bureau, operation of the Joint Arctic Weather Stations in the Queen Elizabeth Islands at Resolute, Alert, Eureka, Isachsen and Mould Bay, including maintenance and development of the supporting airstrips at the last four of these stations, and operation of telecommunications facilities at these four stations in support of the meteorological program.

#### Long-Term Plans

To provide more complete meteorological and related scientific information in the North, necessitating an expanded network of surface weather observing stations and improved equipment for upper air observations to higher levels; to provide forecasting services as needed for expanding activities in the North; to provide more married living accommodations at several locations in order to encourage more experienced personnel to serve at these stations; to operate seismic vaults for the Department of Energy, Mines and Resources at a few locations, and to undertake a program of ozone, water vapour and radiation observations to high levels in the atmosphere at certain stations.

#### Review of 1969 Operations

The synoptic and hourly weather reporting network, north of 55° N which includes the Joint Arctic Weather Stations and the DEWline Stations increased by three to 59 stations; the new stations being Rea Point A, Northwest Territories, Tuktoyaktuk A, Northwest Territories and Deception Bay, Quebec. The Polar Continental Shelf Project for detailed weather observations at four locations on Meighen Island icecap completed its second year of a three-year study. This project received additional meteorological instruments and supplies from the Meteorological Branch.

The snow survey network was increased by one to 26 stations. Six stations continued to take radio-active fall-out samples. The noctilucent cloud observing network decreased by one to 16 while the visual auroral program continued at 16 stations. Networks for observing other parameters were as follows: autographic rain record, 11 stations; sunshine, 16 stations, a decrease of one; soil temperature, four stations, an increase of one; evaporation, six stations, an increase of one; ozone, one station; and radiation, five stations.

Seventy-five percent of the surface weather stations north of 55°N were visited by meteorological inspectors at least once in 1969.

Sixty stations in the Northwest Territories and Yukon Territory participated in the continuing programs to obtain the dates of break-up and freeze-up of rivers, lakes and salt water.

All the upper air stations maintained their full program of two rawinsonde ascents per day sending instruments to heights averaging over 90,000 ft. to measure and transmit temperature, pressure and relative humidity data throughout the ascents. These instruments were also tracked to determine the upper winds at the various levels. Significant progress was made in the effort to achieve higher levels in upper air and upper wind observations.

The construction of the new upper air station at Cambridge Bay was undertaken and is nearing completion and plans are underway to transfer the upper air observing operations from Coppermine to Cambridge Bay early in 1970. Seismic observations were commenced at Inuvik and there are now three seismological observing stations located at Coppermine, Frobisher and Inuvik.

The Arctic Weather Office at Edmonton provided forecasts for various activities in the Arctic. The increased activity on land, on water and in the air necessitated an expansion in these forecast services, and in many cases routine daily issues were substituted for the previous "on request" programs. Forecasts were also provided for the Yukon, Baffin Island and the southern part of the Northwest Territories by Weather Offices at Whitehorse, Winnipeg, Goose Bay and Frobisher.

The Central Analysis Office in Montreal routinely issued forecasts for high altitude aviation for areas extending from the Canada-U.S. border to the North Pole. These forecasts were distributed throughout Canada, and internationally, by facsimile.

The Ice Central in Halifax issued seasonal ice outlooks, thirty-day ice forecasts and short-range ice forecasts for Arctic and sub-Arctic waters. A Field Ice Office was operated at Frobisher from mid-July to early September to provide ice information for the Hudson Bay shipping route, Foxe Basin and the Eastern Arctic. A Field Ice Forecast Office was operated at Edmonton from mid-July to early October to provide ice forecasts for Arctic waters.

During 1969, 2,112 flying hours of ice reconnaissance were completed in the Arctic from the middle of April to the end of November. The principal aircraft used were two chartered Douglas DC-4 and one departmental Douglas DC-3. Shipboard ice observers served 971 days on Canadian Coast Guard icebreakers and S.S. *Manhattan* in Arctic waters over the season.

Ice observers were assigned to S.S. *Manhattan* and C.C.G.S. *John A. Macdonald* for the Northwest Passage Tanker Trials. One of the DC-4 aircraft was additionally equipped with three remote sensing systems (Infrared Scanner, laser profilometer and panoramic aerial camera). Data obtained from these systems was dropped to S.S. *Manhattan* for inclusion with other data acquired on the project.

Thirty-seven selected stations provided daily "Ice Reports Shore" during the navigation season and twenty-seven sites provided weekly ice thickness reports throughout the winter for the Arctic area.

The Arctic Weather Stations at Resolute, Alert, Eureka, Isachsen and Mould Bay continued to be operated jointly by the Canadian Meteorological Branch and the United States ESSA Weather Bureau. In addition to the regular surface synoptic and upper air observations, the following programs were also carried out:

- a) hourly surface weathers, total ozone and ozonesonde observations, soil temperature, noctilucent clouds, evaporation rates, radioactive fallout — all at Resolute only;
- b) solar and net radiation measurements — Resolute, Mould Bay and Alert, plus sky and reflected radiation measurements at Resolute;
- c) auroral observations — Resolute, Alert, Isachsen, Mould Bay;
- d) sunshine record, snow survey and growth of sea ice — all stations; and
- e) at Alert, the meteorological technicians operate the superneutron monitor for Atomic Energy of Canada. Other programs are carried out on a continual basis i.e. seismological observations at Mould Bay, Alert and Resolute by Department of Energy, Mines and Resources Observatories Branch personnel, and special seismological observations at Mould Bay by Geotech Teledyne Company personnel (United States).

The program of improved point-to-point communications system was completed when radio teletype was installed at the remaining three stations — Alert, Isachsen and Mould Bay in midsummer. To maintain the equipment, a Canadian electronics technician has been assigned to each station, taking over, in addition, the maintenance of the radiosonde and all electronic and radio gear which formerly had been the responsibility of the United States electronics technicians.

As a consequence, the radio operators at each station have been replaced by meteorological technicians who now perform surface weather observations and radio communications in addition to their regular upper air observational duties.

At Resolute most surface weather instruments were relocated on to a specially constructed pad which ensures proper drainage and easier access.

A fourteen-room barracks, complete with all indoor conveniences, and a new powerhouse were constructed at Mould Bay during the summer. Two new generators were installed in the powerhouse.

The presence of excessive suspended solids plus high iron content delayed the use of water from the dam constructed at Mould Bay. It is expected that the water will become clear over a period of a year or two.

A water pipeline was constructed at Alert, running from the DND Camp site to the DOT Weather Station. Additional oil storage tanks were also erected to give Alert a full year's capacity of fuel.

Commercial airlift was used in support of Isachsen, Eureka and Mould Bay, while supporting airlift for Alert was provided by Canadian Forces.

### Plans for 1970

The transfer of upper air observations from Coppermine to Cambridge Bay will be effected as soon as the new GMD rawinsonde equipment together with the new electrolytic hydrogen generator can be installed. At Inuvik it is planned to improve the upper air observing program by constructing an addition to the present rawinsonde tower and installing a GMD rawinsonde set.

At the Joint Arctic Weather Stations it is planned to establish additional solar and net radiation measuring instrumentation. These installations will be made at Eureka and Isachsen.

It is also planned to purchase the materials for a new powerhouse and water storage facilities at Eureka.

For the 1970 Arctic shipping season it is planned to originate ice forecast service and advice from the Ice Central in Halifax, with a direct communication link to Edmonton to permit facsimile broadcast of ice charts from that location.

Ice reconnaissance for 1970 will continue at approximately the same level as in previous years, although there may be some increase in early season activity.

## **DEPARTMENT OF TRANSPORT**

### **TELECOMMUNICATIONS AND ELECTRONICS BRANCH**

#### **Responsibilities**

To provide radio aids to air and marine navigation; to provide radio facilities for various scientific organizations and for meteorological observations; to provide other telecommunication facilities as required.

#### **Long-Term Plans**

To expand operations in response to developing technology on increasing demand; the further development of telecommunication facilities for the transmission and reception of voice and record traffic to additional stations as required, which involve the administration of services for government needs and may include public needs as well.

#### **Review of 1969 Operations**

Evaluation to determine the applicability of an Omega Navigational System for both air and marine navigation in the Canadian Arctic and northern Canada continued during this period with installation of Omega receivers in various aircraft.

#### **Arctic, Hudson Bay and Strait**

Effective September 1, 1969 improved service to shipping in northern areas was implemented when coast stations in the Arctic, Hudson Bay and Strait began broadcasting marine weather and ice information with the content revised to satisfy more closely the current needs of shipping in these areas. These revised broadcasts eliminate duplication of information and result from a general reorganization of communications services in these areas.

#### **Mackenzie River System**

Communications between CCG vessels on the Mackenzie River System, the District Marine Agent at Hay River, N.W.T., and the shore stations along the system, were improved by the provision of a new working frequency. The allocation of a new frequency relieves the load on the common working frequency, 5490 kHz, used for many years by shipping on the Mackenzie River System.

#### **Baker Lake**

Radio teletype circuit to Churchill completed.

#### **Cambridge Bay, Northwest Territories**

To improve air-ground communications with international air carriers operating in the polar regions, international air-ground frequencies were commissioned at this location. The station works in close coordination with other northern network stations located at Frobisher Bay, Resolute and Churchill, and also with Edmonton, where the Northern Control and the Upper Flight Information Region (UIR) control centre is located.

**Eureka, Northwest Territories**

An obsolete radiobeacon was replaced with new dual 400 W equipment and placed on 24-hour operation. Service had previously been provided on an "on request" basis.

**Falher, Alberta**

A non-directional radiobeacon was placed in service at this location.

**Fort McMurray, Alberta**

An Instrument Landing System (ILS) was installed and operating on test prior to official commissioning.

**Fort Nelson, British Columbia**

An Instrument Landing System (ILS) was placed in service.

**Fort St. John, British Columbia**

A VHF Omni-directional range (VOR) was placed in service.

**Goose Bay, Newfoundland**

Telex was placed in service in order to expedite the handling of ship-shore message traffic.

**Inuvik, Northwest Territories**

Telex was placed in service in order to expedite the handling of ship-shore message traffic.

**Isachsen, Northwest Territories**

An obsolete radiobeacon was replaced with new dual 400 W equipment and placed on 24-hour operation. Service had previously been provided on an "on request" basis.

**Liard River, British Columbia**

A radiobeacon with voice channel and other air-ground VHF frequencies were placed in service at the airstrip. These facilities are controlled from the aeradio station at Watson Lake, Y.T.

**Mould Bay, Northwest Territories**

An obsolete radiobeacon was replaced with new dual 400 W equipment and placed on 24-hour operation. Service had previously been provided on an "on request" basis.

**Smith River, British Columbia**

The low frequency radio range and associated aeradio station were decommissioned coincident with the commissioning of the non-directional radiobeacon and air-ground frequencies at Liard River, B.C.

### **Spence Bay, Northwest Territories**

Established NDB August 23, 1969.

### **Resolute, Northwest Territories**

During "Operation Manhattan" a radioteletype service was established between the Resolute Marine/Aeradio station and the CCGS *John A. Macdonald*, the icebreaker which took part in this operation. As there were a number of press reporters aboard the *John A. Macdonald* this radioteletype circuit made possible the handling of large volumes of press reports in addition to the normal marine services operational and administrative traffic.

Radiotelegraph circuits linking Resolute to outlying Joint Arctic Weather Stations (JAWS) were replaced with radioteletype.

### **Wabush, Newfoundland**

A second aeronautical radiobeacon was placed in service and a VHF Omnidirectional range (VOR) was installed but has not yet been commissioned.

### **Watson Lake, Yukon Territory**

Established NDB October 2, 1969.

### **Whitehorse, Yukon Territory**

VOR originally planned during 1969 is deferred to 1971.

## **Plans for 1970**

### **General**

The program for the replacement of the Philip's ES-2 Message Switching System presently employed on the air operations teletype network by the Computerized Air Operations Network Message Switching System is proceeding and is expected to be completed during the summer of 1970. All northern aeradio stations having reliable landlines will be connected into this system.

### **Point-to-Point Communications in the North**

During 1970, it is expected that radiotelegraph circuits between Frobisher Bay and Clyde River, Northwest Territories, and radiotelegraph circuits at Schefferville, Natashquan, Fort Chimo, Border and Lake Eon, in the province of Quebec, will be replaced by radioteletype. In addition, two radioteletype links are being commissioned at Churchill, Manitoba, running into Inoucdjouac and Poste-de-la-Baleine, P.Q. Single sideband installations are being made at these locations for back-up communications in support of the radioteletype.

### **Labrador Coast and Strait of Belle Isle**

Modernization of ship-shore communications services along the Labrador coast involves the withdrawal of staff from Hopedale Marine Radio station and the operation of this station by remote control from Goose Bay Marine/Aeradio. This move is made feasible by the availability of good landline facilities in the area. This

reorganization is planned for the beginning of the 1970 navigation season and is expected to be accomplished with no deterioration in the safety and public correspondence services now being provided. The reorganization will result in substantial savings to the Department.

To improve ship-shore coverage along the northern coast of Labrador a 4 MHz radiotelephone channel (CH81) will be installed at Goose Bay and Resolution Island Marine Radio stations.

During the fall of 1970, it is planned to relocate the isolated Belle Isle Marine Radio station to St. Anthony, Nfld.

#### **Hudson Bay and Strait**

In the Hudson Bay and Strait area, as part of an over-all reorganization of ship-shore communications facilities, it is planned to decommission the Cape Hope's Advance, P.Q. Marine Radio station and to relocate the non-directional radiobeacon to Koartak, P.Q. The latter location will continue the meteorological service now being provided by Cape Hope's Advance.

#### **Mackenzie River System**

Further ship-shore communications improvements are planned in the Mackenzie River system with the commissioning of a new frequency, 5803 kHz, at the shore stations in the system. Further planning includes eventual conversion of the system to single sideband operation.

#### **Fort Smith**

New transmitter building planned.

#### **Great Slave Lake, Northwest Territories**

Plan to establish marine radio marker beacons at Slave Point, Hardisty Island and Pilot Point.

#### **Hay River, Northwest Territories**

An Instrument Landing System (ILS) will be commissioned.

#### **Inuvik, Northwest Territories**

ILS Glide path and middle marker installations planned.

#### **The Pas, Manitoba**

A VHG Omni-directional range (VOR) will be commissioned.

#### **Thompson, Manitoba**

An Instrument Landing System (ILS) and a VHF omni-directional range (VOR) will be commissioned.

#### **Yellowknife, Northwest Territories**

An Instrument Landing System (ILS) will be commissioned.

**DEPARTMENT OF TRANSPORT**  
**CONSTRUCTION ENGINEERING AND ARCHITECTURAL BRANCH**

**Responsibilities**

To provide construction services in the field of Air Services facilities development for the Department of Transport.

**Long-Term Plans**

Normal planning based on departmental five-year plan to design and coordinate the construction of airport facilities, lighting, buildings and other miscellaneous projects.

**Review of 1969 Operations**

**Runways and Lighting Projects**

Churchill Falls, Fort Chimo, Schefferville, Baker Lake, Churchill, Resolute Bay, Beaver Creek, Coppermine, Fort Smith, Hay River, Inuvik, Norman Wells, Peace River, Watson Lake, Yellowknife.

**Buildings**

Resolute Bay, Cambridge Bay, Fort McMurray, Fort Nelson, Fort Reliance, Fort Resolution, Fort St. John, Fort Smith, Hay River, Watson Lake, Cree Lake.

**Aids to Air Navigation**

Churchill Falls, Cape Hope's Advance, Resolute Bay, Fort McMurray, Fort St. John, Grande Prairie, Hay River, Inuvik, Watson Lake.

**Miscellaneous Projects — Water and Sewer, Power, Storage Space**

Nottingham Island, Poste de la Baleine, Coral Harbour, Resolute Bay, Cambridge Bay, Dawson Creek, Fort McMurray, Fort Reliance, Fort Simpson, Hay River, Norman Wells.

Approximate Value of Construction Projects \$6,055,000

**Plans for 1970**

**Runway and Lighting Projects**

Churchill Falls, Fort Chimo, Frobisher Bay, Paint Hills, Povungnituk, Rupert House, Schefferville, Moosonee, Baker Lake, Churchill, Rankin Inlet, Resolute Bay, Dawson Creek, Fort Chipewyan, Fort McMurray, Fort Resolution, Fort St. John, Fort Simpson, Grande Prairie, Inuvik, Norman Wells, Ross River, Uranium City, Yellowknife.

**Buildings**

Cambridge Bay, Fort Chipewyan, Fort Nelson, Fort St. John, Fort Simpson, Hay River, Peace River, Sachs Harbour, Teslin, Whitehorse, Wrigley.

**Aids to Air Navigation**

Frobisher Bay, Fort McMurray, Fort Nelson, Fort Smith, Grande Prairie, Hay River, Inuvik, Peace River, Ross River, Whitehorse.

**Miscellaneous Projects – Water and Sewer, Power, Storage Space**

Frobisher Bay, Schefferville, Coral Harbour, Fort Reliance, Fort Resolution, Fort Simpson, Hay River, Inuvik, Teslin, Yellowknife.

Approximate Value of Construction Projects \$6,278,000

# **DOMINION BUREAU OF STATISTICS**

## **DOMINION BUREAU OF STATISTICS**

### **AGRICULTURE DIVISION**

#### **Review of 1969 Operations**

##### **Fur Production**

Data were obtained on the numbers and values of wildlife pelts taken in both regions for the fur season 1968-69. The number of pelts exported from the Northwest Territories and the prices paid to trappers were provided by the Government of the Northwest Territories, Yellowknife, Northwest Territories. The number of pelts exported from the Yukon Territory and the prices paid to trappers were provided by the Yukon Territorial Game Branch, Government of the Yukon Territory, Whitehorse, Yukon Territory.

##### **Plans for 1970**

No change in procedure is contemplated in the future.

### **CENSUS DIVISION**

##### **Responsibilities**

It is the responsibility of the Division to conduct a census of population and agriculture in the North as required under the Statistics Act.

##### **Long-Term Plans**

Up to the 1966 Census the responsibility of collecting census data in the Northwest Territories was delegated totally to the Royal Canadian Mounted Police. It is our plan for future censuses to have regular census commissioners and enumerators gradually take over the more settled areas of the Northwest Territories. The Yukon Territory is already under regular census commissioner authority.

#### **Review of 1969 Operations**

A variety of possible methods of collecting census data in the North were evaluated during 1969. As a result of this evaluation it has been agreed that sampling will not be used in the North due to the sparse population density in that part of the country. In addition, the system of self-enumeration to be utilized in the rest of Canada will only be used to a limited extent in the North, in urban areas such as Yellowknife and Whitehorse. In other northern areas, enumerators will be required to travel fairly long distances to cover their districts, and in some cases, transportation and access problems are quite significant. Accordingly, in these areas it was considered uneconomic to ask the enumerator to make the two trips implied in the self-enumeration procedure. Enumeration in these areas will thus be completed by the enumerator during a single visit to that household. To the maximum extent possible, civilian enumerators will be employed in the North for the 1971 Census, but the Royal Canadian Mounted Police will still be called upon to complete a small proportion of households located in remote areas.

## **Plans for 1970**

The Census Division plans to finalize northern enumeration procedures for the 1971 Census. In addition, it is expected that representatives of the Division will travel north to visit with local officials to review enumeration procedures and to discuss procedures for the hiring of enumerators and other temporary staff.

### **EDUCATION DIVISION**

#### **Responsibilities**

To collect and publish statistics on schools and other education institutions in the Northwest Territories and the Yukon Territory.

#### **Long-Term Plans**

To continue to improve the annual education statistics available for the North.

#### **Review of 1969 Operations**

Statistics were collected and published for both territories on secondary schools, on enrolments in vocational and technical education, on adult education and on libraries.

For the Northwest Territories, in cooperation with the Territorial Government, an extra tabulation classifying enrolment by race (Eskimo, Indian and Other) is prepared at the elementary secondary level.

Statistical summaries on elementary-secondary schools, where appropriate and needed, are provided to the departments concerned.

## **Plans for 1970**

A new, comprehensive publication, entitled *Education North of the 60th* is presently being prepared in the Education Division. The report will cover all aspects of education in the North and publication is scheduled before the end of the calendar year.

### **HEALTH AND WELFARE DIVISION**

The functions of the Health and Welfare Division are varied and the responsibilities, long-term plans, review of 1969 operations and plans for 1970 are listed separately under the following headings: notifiable diseases; tuberculosis; hospital morbidity; vital statistics; general and allied hospitals; health manpower; and institutions other than hospitals.

#### **NOTIFIABLE DISEASES**

##### **Responsibilities**

To collect each week reports of new cases of notifiable diseases (certain epidemic and infectious diseases as recommended by the Dominion Council of Health) for the Northwest Territories and Yukon Territory.

### **Long-Term Plans**

There are no significant long-term changes planned in this area.

### **Review of 1969 Operations**

A weekly summary report on notifiable diseases is prepared for distribution to provincial departments of health, to the National Health and Welfare Department and to other agencies. Statistical information related to notifiable diseases is also published annually. The weekly summary and annual report are both entitled, *Notifiable Diseases*, catalogue numbers 82-001 and 82-201. The weekly report and the annual report include any information received for the Northwest Territories and Yukon Territory. Processing of this information for the North in 1969 took approximately one clerk-week.

### **Plans for 1970**

It is intended to carry on in 1970 in the same way as in 1969.

## **TUBERCULOSIS**

### **Responsibilities**

To collect information on notifications of new active and reactivated cases, on tuberculosis out-patient drug treatment and on tuberculosis institutional data.

### **Long-Term Plans**

There are no long-term plans for significant changes in this area.

### **Review of 1969 Operations**

The notifications of new active and reactivated cases were collected, as were the out-patient treatment particulars. The institutional data on admissions and separations were also collected for the Northwest Territories. (There are no tuberculosis hospitals in the Yukon Territory).

This information is published in "Tuberculosis Statistics, Volume I — *Tuberculosis Morbidity and Mortality*, catalogue number 83-206.

The work in 1969 took about two clerk-weeks.

### **Plans for 1970**

It is intended to carry on in 1970 in the same way as in 1969.

## **HOSPITAL MORBIDITY**

### **Responsibilities**

To collect information on the admission-separation forms for general and allied special hospital cases of residents in the Northwest Territories and the Yukon Territory.

## **Long-Term Plans**

There are no long-term plans in this area.

## **Review of 1969 Operations**

Work began on the preparation of historical statistics on hospital morbidity.

## **Plans for 1970**

A special historical report is now under preparation covering hospitalized cases during the years 1962 to 1968 inclusive, in the Northwest Territories and the Yukon Territory. The information will be in terms of the three-digit classification of the International Classification of Diseases and will further distinguish the hospitalized cases by three ethnic groups: Indian, Eskimo and other.

Approximately one month of clerical time and some computer resources will be involved in concluding this operation.

## **VITAL STATISTICS**

### **Responsibilities**

Under long-standing arrangements, the vital statistics offices of the two Territories supply the Dominion Bureau of Statistics with copies of birth, marriage, stillbirth and death records filed in their jurisdictions under their Vital Statistics Ordinances, from which statistics are compiled for official national statistics. In turn, the Dominion Bureau of Statistics supplies the Territorial Office with detailed annual tabulations relating to their areas, for local and administrative purposes. In addition to total counts of such events occurring in each local area, these tabulations provide detailed information on marriage, fertility and mortality rates for the total population and the principal ethnic groups, which serve for long-term planning of health, social welfare and other services.

### **Long-Term Plans**

Forms used for the reporting of births, marriages and deaths will be revised to conform to prototypes recommended by the Vital Statistics Council for Canada. Ordinances will also probably be revised to conform to model legislation recommended by the Council. Computerization of tabulation procedures in the Dominion Bureau of Statistics will result in acceleration of tabulations supplied to the Territorial administrations.

## **Review of 1969 Operations**

Detailed tabulations of births (cross-tabulating ages and other characteristics of the parents and of the event), marriages (by religion, status, etc.) and deaths (by cause, age, sex and other characteristics) were provided to the northern administrations covering the events occurring in 1968. Arrangements were made, for the first time (in 1968) to classify all events by newly-organized health districts.

## **Plans for 1970**

Medical information on death records were classified by a new International Disease Classification (effective January 1, 1969) thus providing more detailed information than formerly on causes-of-death, for epidemiological and other research purposes. The 1969 mortality tabulations, which will be supplied to the Territories during 1970 will therefore be based on this new classification.

## **GENERAL AND ALLIED HOSPITAL**

### **Responsibilities**

To collect information on the general and allied hospitals operating in the Northwest Territories and Yukon Territory.

### **Long-Term Plans**

There are no new long-term plans in this area.

## **Review of 1969 Operations**

In the Northwest Territories and the Yukon Territory there are nine public hospitals with 263 beds, one private hospital with 12 beds and 27 federal hospitals with 345 beds. Hospital returns are sent to each hospital through the Yukon Territorial Hospital Insurance Service in Whitehorse and through the Department of Indian Affairs and Northern Development in Ottawa. General and financial returns go to public hospitals; general returns only go to federal and private hospitals. The statistics are published in one quarterly report, catalogue number 83-001, and 12 annual reports, catalogue numbers in the 83-200 series.

The quarterly hospital statistical indicator program was introduced in 1969, along with additional data on salary surveys of hospital nurses.

It takes roughly two days of clerical time to transcribe all the data in this area that are published on the Northwest Territories and Yukon Territory. These figures are then included in the regular computer program that transforms all this input into the various publications.

## **Plans for 1970**

No particular changes are contemplated for 1970.

## **HEALTH MANPOWER**

### **Long-Term Plans**

It is anticipated that in 1970-71 several surveys on selected manpower groups (registered nurses, etc.) will be undertaken to show the mobility of these groups, their training, attrition rates etc.

## **Plans for 1970**

Statistics on public health nurses will be published in 1970.

## INSTITUTIONS OTHER THAN HOSPITALS

### Long-Term Plans

It is the intention of Health and Welfare Division to survey institutions, such as nursing homes, homes for the aged, welfare institutions.

## JUDICIAL DIVISION

### Responsibilities

The Judicial Division has responsibilities for statistics on law enforcement, the administration of justice and corrections, and for the sequential integration of these data to give a full statistical description of the process of dealing with offences, accused persons and offenders. The objective of the Division is to show the effectiveness of the law enforcement, judicial and rehabilitative processes, and permit the various agencies of the criminal justice system to evaluate their efficiency.

### Long-Term Plans

There are no long-term future plans, except changes which the new integrated criminal statistics information system may bring about in the present criminal statistics.

### Review of 1969 Operations

*Statistics of Criminal and other Offences*, catalogue number 85-201. Data for the Northwest Territories and the Yukon Territory include:

- a) persons charged with indictable offences by sex and persons convicted by specified age groups and sex;
- b) persons convicted under the Narcotic Control Act by type of offence and country of birth;
- c) convictions of offences punishable on summary conviction.

Respondents: three local court clerks.

*Juvenile Delinquents*, catalogue number 85-202.

Indications for the Yukon and Northwest Territories are:

- a) appearances before the courts and results;
- b) residence;
- c) characteristics.

Respondent: one local court clerk.

*Police Administration Statistics*, catalogue number 85-204.

Data on police strength, personnel and transport for the Northwest Territories and Yukon Territory are broken down by:

- a) police force;
- b) ratio of policemen per automobile.

Respondents: Royal Canadian Mounted Police, "Air" Detachment.

*Crime Statistics (Police)*, catalogue number 85-205.

*Traffic Enforcement Statistics*, catalogue number 85-206.

Information for the Northwest Territories and Yukon Territory are distributed by type of force.

Offences under the Criminal Code, Federal and Territorial Regulations are broken down by offence reported, unfounded, actual number, cleared otherwise, persons charged.

Rates per 100,000 population aged seven years and over and percentages are shown.

Motor vehicles stolen, persons missing, persons located and persons drowned are included in *Crime Statistics*.

Traffic accidents, persons killed, persons injured and property damage are given in *Traffic Enforcement Statistics*.

*Correctional Institution Statistics*, catalogue number 85-207.

- a) percentage of number of persons in custody to standard capacity for the Northwest Territories and Yukon Territory;
- b) Population movement in and out for the Royal Canadian Mounted Police Guardrooms, Whitehorse Correctional Institution, Yukon Mobile Institution, Yellowknife Correctional Camp and Fort Smith Training Centre;
- c) Place of sentence of territorial offenders by penitentiary.

Respondents: twelve local officers.

*National Parole Board Statistics*<sup>1</sup>

Information for the Northwest Territories and Yukon Territory compiled on:

- a) decisions made by the National Parole Board;
- b) persons released on parole;
- c) persons terminating parole;
- d) persons denied parole.

<sup>1</sup>Source: National Parole Board publication but information processed in the Judicial Division, Dominion Bureau of Statistics.

*Murder Statistics*, catalogue number 85-209.

Murder incidents and victims in the territories.

#### **Plans for 1970**

No changes in operations are contemplated for 1970.

### **MANUFACTURING AND PRIMARY INDUSTRIES DIVISION**

#### **Responsibilities**

To collect, compile, analyze and publish, within the provisions of the Statistics Act, statistics on manufacturing, mining, logging, fishing and energy for the Northwest Territories and the Yukon Territory.

#### **Long-Term Plans**

To continue and, where applicable, to intensify the current statistical program, including the possibility of publishing more data now considered confidential under provisions of the Statistics Act.

#### **Review of 1969 Operations**

The Division continued the collection and publication of data on mining, energy, manufacturing, fishing and forestry for the Yukon Territory and Northwest Territories.

Industries surveyed accounted for 98 per cent of the value of production of the goods-producing industries in the territories. (This information appears in preliminary "Survey of Production" data issued by the National Output and Productivity Division of the Dominion Bureau of Statistics).

In mining, the largest industrial sector by output, regular annual statistics continued to be issued for both the Northwest Territories and for the Yukon Territory. In data of the crude petroleum and natural gas industry, a breakdown was introduced separating a combination entitled "Yukon Territory, Northwest Territories and Arctic Islands" from "offshore and Hudson Bay". Permission has also been secured from respondents for the release of data separating "Hudson Bay" and "East Coast offshore" and "West Coast offshore". (These are all areas under federal jurisdiction, but the latter two are not in the North.)

Monthly and annual data were again published on pipelines for the Yukon Territory.

The monthly electric power statistics, first published for each territory in 1968, have been continued, in addition to the annual data also issued for each territory.

As a result of the Division's policy of seeking respondent authorizations to release certain statistics which would otherwise be confidential, the annual Census of Manufactures has continued to provide publishable totals for both the Northwest Territories and the Yukon Territory.

Annual data on each territory are being published for fishing, while figures are issued monthly on this industry for the Northwest Territories.

In forestry, data were published for the territories on a combined basis only.

### **Plans for 1970**

To continue the present expanded program of publication.

## **TRANSPORTATION AND PUBLIC UTILITIES DIVISION**

### **Responsibilities**

To develop and publish statistical series covering the financial and operating aspect of rail, water, motor vehicle and air transport, as well as communication systems and other utilities for the Yukon Territory and the Northwest Territories.

### **Long-Term Plans**

No future plans with a specific orientation to the North.

### **Review of 1969 Operations**

#### **Rail Transport**

Statistics are collected of common carrier railways, including those operating in the Yukon Territory and the Northwest Territories. These railways are the White Pass and Yukon Route Railway and the new Great Slave Lake Railway.

The publications of direct relevance are: *Railway Transport, Parts I to VI*, catalogue numbers 52-207 to 52-212. These annual reports comprise a statistical summary, as well as statistical reports on finances; equipment, track and fuel; operations and traffic; freight by commodities; and employment. Prior to 1968, the statistics for the White Pass and Yukon Route Railway were shown separately in Parts II, III, IV and V. This was discontinued commencing with 1968 statistics, but the data is available from source documents at the Dominion Bureau of Statistics. Separate details for the Great Slave Lake Railway have not yet been made available to the Dominion Bureau of Statistics by the Canadian National Railways.

#### **Road Transport**

The principal statistics covering aspects of the North are contained in the following publications:

*DBS Daily Bulletin* (once each month), catalogue number 11-001;

*Motor Vehicle Traffic Accidents* (quarterly), catalogue number 53-001;

*Road and Street Mileage and Expenditure*, catalogue number 53-201;

*Motor Vehicle Traffic Accidents*, catalogue number 53-206;

*Motor Vehicle – Part II – Motor Fuel Sales*, catalogue number 53-218;

*Motor Vehicle – Part III – Motor Vehicles Registrations*, catalogue number 53-219; and

*Motor Vehicle – Part IV – Revenues*, catalogue number 53-220.

In the report on *Road and Street Mileage and Expenditure*, the figures for the Northwest Territories and the Yukon Territory are shown separately but in all other cases the two geographical areas are combined. Reports are annual publications unless otherwise indicated.

Sources for statistics on road transport are:

1. Territorial Treasurer, Whitehorse, Yukon Territory;
2. Director, Northern Administration Branch, Department of Indian Affairs and Northern Development;
3. Registrar of Motor Vehicles, Department of Indian Affairs and Northern Development, Whitehorse, Yukon Territory; and
4. Commissioner of the Northwest Territories, Yellowknife, Northwest Territories.

### Water Transport

There are no significant ports in the Yukon Territory and traffic in the Northwest Territories is coastal only (from Canadian port to Canadian port). Annual publications of the Dominion Bureau of Statistics which identify data for the Northwest Territories are listed below:

*Shipping Report – Part III, Coastwise Shipping*, catalogue number 54-204;

*Water Transportation*, catalogue number 54-205;

*Shipping Report – Part IV, Origin and Destination for Selected Ports*, catalogue number 54-206; and

*Shipping Report – Part V, Origin and Destination for Selected Commodities*, catalogue number 54-207.

In 1969, four companies based in the Northwest Territories submitted data for these reports.

### Air Transport and Civil Aviation

The Aviation Statistics Centre of the Dominion Bureau of Statistics provides statistical services to the Department of Transport and the Canadian Transport Commission, particularly the Air Transport Committee, and prepares special area and other studies at their request. It is also responsible for the Dominion Bureau of Statistics publications in Air Transport.

Air traffic statistics for individual reporting airports, including 20 in the Northwest Territories and the Yukon Territory, are released for the Department of Transport in monthly and annual reports entitled *Aircraft Movement Statistics*.

Another report, *Airline Passenger Origin and Destination Statistics*, first published by the Dominion Bureau of Statistics in 1970, provides data on domestic air passenger traffic generated by specific points, including some in the North, with point-to-point detail.

### **Public Utilities**

Annual statistics are collected and published which include details for the Northwest Territories and the Yukon Territory in the two reports listed below.

*Telegraph and Cable Statistics*, catalogue number 56-201:

Contains information on the number of commercial messages to and from ships and to and from stations for the two territories combined. Information is obtained from Canadian National Telecommunications and the Department of Transport.

*Telephone Statistics*, catalogue 56-203:

Includes details of telephones by type of service, numbers of residence telephones and telephones on automatic switchboards and operated by central energy; details of miles of lines of various types; number of systems and exchanges served by high frequency radio systems; employees, salaries and wages; capital and repair expenditure. In some tables the figures for the two territories and combined; in others they are included with British Columbia; and in some, figures for the Northwest Territories are shown separately. Sources of information are Bell Canada and Canadian National Telecommunications.

### **Plans for 1970**

To continue the current statistical series for all modes of transportation and for communication systems and other utilities.

# **ELDORADO NUCLEAR LIMITED**

## **ELDORADO NUCLEAR LIMITED**

### **Responsibilities**

To operate a uranium mine in the Beaverlodge area of northern Saskatchewan and to engage in such exploration activity as the Company may see fit.

### **Long-Term Plans**

To continue the above with due regard to available uranium markets.

### **Review of 1969 Operations**

The scope of operations was curtailed and the amount of uranium produced was approximately 25 per cent less than in 1968. Additional housing was established for employees living in Uranium City. The number of employees was reduced by approximately 245.

### **Plans for 1970**

Present plans call for production generally comparable to 1969, with no substantial reduction in numbers employed.

**GOVERNMENT OF THE  
NORTHWEST TERRITORIES**

## GOVERNMENT OF THE NORTHWEST TERRITORIES

### Responsibilities

To exercise local government jurisdiction within the Northwest Territories, exclusive of control over natural resources (except game which is a Territorial resource); and the takeover of functions now exercised by the Department of Indian Affairs and Northern Development.

### Long-Term Plans

To develop the Northwest Territories through legislation and administration geared to the special social and economic needs of the North, and to involve all northern residents in the processes of government and social development.

### Review of 1969 Operations

The year under review was one of important advancement for both the government and the people of the Northwest Territories. Proclamation of 1970 as the official Centennial Year triggered a year of tremendous activity across the Northwest Territories as plans for the year-long celebration were formulated.

On January 31st, Council approved a new official flag for the Northwest Territories. The flag incorporates the Territorial Shield on a white centre section with blue sections on each end. The design was chosen from among thousands of entries submitted in a nation-wide contest. The winning design was received from Robert Bessant of Margaret, Manitoba.

Development of government in the Northwest Territories took a major step forward with the assumption by the Government of the Northwest Territories of the responsibility for administration of the Mackenzie District. A similar transfer of responsibility for functions in the Eastern Arctic, was scheduled for April 1, 1970.

The organization of government, under the overall responsibility of the Commissioner's Office, is divided into three groups to carry out all the administrative functions. They are assisted in turn, through regional offices at Fort Smith and Inuvik and area offices at various settlements throughout the Northwest Territories.

The three headquarters groups are divided into program department groups, service department groups and service unit groups. Each department or unit is headed by a director or chief who reports to either the Commissioner, Deputy Commissioner or Assistant Commissioner. Regional Directors at Fort Smith and Inuvik (and as of April 1, 1970, those at Frobisher Bay and Churchill) report to the Commissioner.

Completion of a modern, five-storey office complex enabled the main offices of the various departments to be located under one roof.

## **Review of Council Operations 1969**

Three sessions of Council were convened during the year under review. The 38th Session, held in Yellowknife, from January 13th to February 1st, dealt with 20 pieces of legislation, eight recommendations to Council and five sessional papers. A record budget of \$40,606,488 was approved.

A number of major bills were enacted, including the Hamlet Ordinance which permits smaller communities to manage their local affairs through elected councils. A Freshwater Fish Marketing Ordinance provided for Northwest Territories participation with the Federal Freshwater Fish Marketing Corporation. Among amendments to the Game Ordinance was one removing restrictions on Indians and Eskimos hunting caribou for food and permitting the consumption of caribou meat in institutions.

During the 39th session, also held in Yellowknife, from June 16th to 27th, Council passed 31 bills and considered five sessional papers and three recommendations to Council. A Supplementary Appropriations Ordinance was passed providing an additional \$1.8 million in expenditures.

Council accepted a sessional paper outlining a proposed Medicare Plan for the Northwest Territories and one containing proposals for the training of indigenous peoples as game management officers, junior office managers and guides.

Among the Ordinances passed was one permitting collective bargaining between the Commissioner and employee associations.

The 40th session opened at Baker Lake on October 7th, at which time the Commissioner, with the unanimous approval of Council, proclaimed 1970 as the official Centennial Year. The session was recessed on October 10th and reconvened in Yellowknife on November 10th to receive the statement of the Honourable Jean Chrétien regarding the Federal Government's plans for implementation of the recommendations of the Advisory Commission on the Development of Government in the Northwest Territories (the Carrothers Commission).

The Minister outlined a number of proposed amendments to the Northwest Territories Act which would provide more self-government for the Territories. One amendment would increase the number of elected council members from seven to nine. Others would extend the life of the Council from three to four years, permit the Council to set the indemnity of its members, reduce the voting age in Territorial elections and reduce the period for federal disallowance of Territorial Ordinances from two years to one year.

Mr. Chrétien also affirmed that the Federal Government should continue to manage the natural resources of the Northwest Territories and that provincial status was not a realistic alternative at this time.

### **THE PUBLIC SERVICE**

The Government of the Northwest Territories functions within ten departments, with supporting information, legal advisory, personnel and management audit

services. Details of the responsibilities, functions and operations of these departments and services are set out hereunder.

## **Department of Local Government**

### **Responsibilities**

Municipal ordinance. Fostering, encouraging and assisting in the development of local government.

### **Review of 1969 Operations**

*Development Division.* Following approval by Council of the Hamlet Ordinance providing for an extension of local government to smaller communities, Pine Point and Fort Simpson became the first centres to be incorporated as Hamlets. Special courses were established to instruct local people in the technique of local government.

*Municipal Division.* Extensive assistance was provided to all municipalities to develop capital expansion programs. New budget forecasting and tax collection methods were introduced. Municipal financial information from the Northwest Territories is now being forwarded to the Dominion Bureau of Statistics for inclusion in national reporting.

*Housing Division.* Passage by Council of the Territorial Rental Housing Program ensured safe, healthy and adequate housing for members of all ethnic groups throughout the Northwest Territories. A survey showed a proven need for 120 houses in the settlements. Thirty-six were constructed during the year with the remainder to be built in 1970-71. Construction of public housing units and extension of accommodation for senior citizens continued and similar projects are being planned in various centres.

*Town Planning and Lands Division.* Acquisition of a lands officer and town planner has enabled the Division to undertake a program of legal land surveys and community development in many communities.

*Office of Civil Emergency Planning.* Emergency committees in 20 communities have been established to respond to emergency situations. Plans are drawn to assign duties to each person or agency during the crisis period.

*Recreation Division.* Expansion and consolidation of recreation services proceeded throughout the Northwest Territories, and special training and leadership programs have been established.

## **Department of Social Development**

### **Responsibilities**

Social assistance, categorical allowances (old age assistance, disabled persons allowance, blind persons allowance), child welfare, medical social services, corrections and alcohol education.

## Review of 1969 Operations

*Child Welfare.* Completion of new receiving homes in Hay River, Fort Smith and Inuvik provided more temporary accommodation for those children whose home situation requires their living elsewhere for a period of time.

Council approved an amendment to the Child Welfare Ordinance making it no longer necessary for a mother who was relinquishing her child to the Superintendent of Child Welfare for adoption purposes to designate the religious persuasion under which the child would be raised.

*Medical Social Services and Rehabilitation.* Plans are being developed to provide a range of medical social services and rehabilitation for the aged, disabled, infirm and mentally retarded. At present there are a limited number of beds available in institutions where persons with special problems can receive appropriate care.

*Territorial Alcohol Education Program.* Community-based programs offering direct help to individuals, families and employers in the treatment of drinking problems were launched in Yellowknife and Frobisher Bay. Counselling clinics, in-service training for counsellors, public seminars, radio programs and distribution of literature on alcohol and alcoholism contributed to a greater awareness and understanding of the problem.

*Correction Service.* A continuing program of in-service training is equipping staff members to handle more effectively the rehabilitation of offenders.

## Department of Education

### Responsibilities

School services, adult education, vocational training, curriculum development.

## Review of 1969 Operations

Following the creation of the new Department of Education responsibility for the education in the Mackenzie District was transferred to the Territorial Government in 1969 and in 1970, the responsibility for education in the Eastern Arctic was also transferred to Yellowknife.

In 1968-69 a total of 8,474 pupils were enrolled in Northwest Territories schools, including 3,342 Eskimo, 1,512 Indian and 3,620 others, an increase of 7.75 per cent over the previous year.

*Adult Education* Basic education classes, community leadership workshops and special education programs for academically retarded students continued under the adult education program.

The housing education program, introducing northern residents to home management involved 1,481 families in the Mackenzie District alone. The last phase of the program was reached in the Eastern Arctic.

A new adult learning centre at Frobisher Bay provided 60 “day release” students and 10 full-time students with schooling in core subjects of three successive grades.

*Post-Secondary Education* During the year, 105 students received financial assistance under the Northwest Territories Students Grants Program. Funds are used for payment of tuition fees, text books, transportation costs, board and lodgings.

*Eskimo Linguistics* Many teachers undertook the taped 150-lesson Eskimo language course, in a program designed to introduce the Eskimo language into the classrooms.

*Curriculum* A 16-volume set of northern-oriented primary readers was completed by the Curriculum Section of the Department of Indian Affairs and Northern Development prior to the Section’s phasing out in Ottawa. The readers are to be printed and distributed to schools in the Northwest Territories.

Two experimental projects were undertaken in the Mackenzie District. At Aklavik a committee of teachers and citizens worked on the development of curriculum material on Indian culture and treaties and the Indian Act. Citizens of Inuvik formed a Family Life Education Program which was implemented in the Samuel Hearne school.

*School Construction* School construction and expansion continued throughout the Northwest Territories. Among the major projects was the opening of the A.V. “Moose” Kerr 10-room school at Aklavik, the 16-room Samuel Hearne secondary school at Inuvik and a 10-room addition to the Sir John Franklin school at Yellowknife.

*Teacher Training and Recruitment* Fifteen students, with a northern background, selected in 1968 for an experimental teacher education program, continued their training program at the Sir John Franklin school in Yellowknife. Following a program of summer school studies at the University of Alberta, 13 graduates began teaching in schools in the Mackenzie District in September.

*Vocational Education* Under an expanded vocational training program, 198 students were enrolled in Sir John Franklin Vocational High School, Yellowknife, and 148 Eskimos from the Eastern Arctic were enrolled in classes at the Churchill Vocational Center.

Approximately 20 Eskimos were relocated in southern Canada for employment, and 15 high school students from the Eastern Arctic were attending southern schools. There were 23 registered apprentices in the Eastern Arctic.

Eighty-two apprentices were indentured in more than 30 designated trades in the Northwest Territories during the year.

## **Department of the Treasury**

### **Responsibilities**

Accounting, liquor, financial and treasury functions of the Territorial Government.

## Review of 1969 Operations

The government's operating and capital requirements for the year were financed from three sources:

- a) receipts consisting of fees, taxes, licences and the liquor system sales;
- b) recoveries from the other governments under cost sharing arrangements;
- c) deficit grants and loans under a one year Federal-Territorial financial agreement.

Expenditures and sources of funds for 1968-69 were as follows:

Expenditures		Source of Funds	
Administration	\$ 2,503,000	Revenues	\$ 7,038,000
Education	3,078,000	Recoveries	2,931,000
Health	2,963,000	Operating Grant	5,153,000
Social Development	1,427,000	Program Transfer	
Local Government	1,440,000	Grant	445,000
Game Management	476,000	Capital Loans	4,629,000
Economic and Community Development	537,000	Excess of Spending	22,000
Justice	1,008,000		
Liquor System	2,180,000		
Capital Projects	4,556,000		
Territorial Housing	60,000		
Total	\$20,218,000	Total	\$20,218,000

*Territorial Liquor System.* Profit from the sale of liquor continued to be the largest single source of revenue for the Territorial Government. In 1968-69 sales increased 15 per cent and profits rose accordingly:

	1967-68	1968-69
Sales	\$3,463,000	\$3,982,000
Net Profit	1,707,000	1,908,000

Sales are through seven stores operated by the staff, five agencies operated by business firms and through some 50 licensed premises.

## Department of the Territorial Secretary

### Responsibilities

Council secretariat, general administrative services of the Territorial Administration, licensing.

## Review of 1969 Operations

*Administrative Services.* Conversion of Central Registry files to a new system was completed, resulting in the creation of more than 10,000 new files. Regional and Area Office files underwent conversion during the year.

*Administration of Ordinances.* Work began on Project Surname, a Centennial project under which Eskimo people are being asked to select and register a surname, by which all members of one family will be known. The goal of the program is to eliminate Eskimo disc numbers and the disc lists.

A central bank of annual information on motor vehicle and operators licences was established.

*Labour Standards.* A number of new regulations under the provisions of the Labour Standards Ordinance established the maximum amounts to be charged an employee for room and board, laundry, uniforms and other benefits. The regulations also provide minimum hours an employee is paid when asked to report to work.

*Public Library Services.* The demand for library service is increasing throughout the Northwest Territories. Plans for new libraries and expanded collections are being developed in many centres. There is a stock of nearly 31,000 volumes in the Library Services' system and during the year approximately 200 rare books were added to the northern book collection.

## **Department of Public Works**

### **Responsibilities**

All aspects of public works operations including design, construction and maintenance of roads, buildings and municipal-type services.

## **Review of 1969 Operations**

*Highway Division.* During the year the Division continued to develop projects for the Federal Department of Indian Affairs and Northern Development and to undertake Territorial projects. Among its main activities during the year was the maintenance of approximately 200 miles of winter trails and 744 miles of gravelled communication and resource development roads.

*Construction Division.* During the year the Division undertook construction of projects amounting to \$4,078,700 for other departments, including \$3,111,300 in works for local government.

*Operations and Maintenance Division.* During the year the Department assumed responsibility in the Mackenzie District for the maintenance and operation of all buildings, water, sewerage and fuel installations; repair and upkeep of all vehicles. In addition the Department is responsible for the supply of heating and power services. All these functions are carried out by the Operations and Maintenance Division, which was voted \$4,503,000 in funds to carry out its responsibilities.

*Operation of Ferries.* The ferry *Johnny Berens*, at the Mackenzie River crossing of the Yellowknife Highway, which is under direct supervision of Departmental headquarters, operated 20 hours daily during the five-month season, May to October, and carried an estimated 14,000 vehicles by season's end.

## Department of Industry and Development

### Responsibilities

Promoting and assisting industrial development, tourism, game administration.

### Review of 1969 Operations

The re-organization of the Department was completed during the year. A Research and Planning Section was established to carry out long-range planning for the Department and to assist in integrating departmental planning with that of the other departments of the Territorial Government. Among the major studies under way included analysis of the forest products and commercial fishing industries of the Northwest Territories.

*Industrial Development Division.* The Division took over effective responsibility for the Mackenzie District during the year and a re-organization of the industrial field staff was undertaken. Industrial Development Officers are now located at Inuvik, Fort McPherson, Coppermine, Cambridge Bay, Spence Bay, Fort Franklin, Fort Simpson, Hay River, Rae and Snowdrift. Similar reorganization was scheduled for the Keewatin and Baffin regions in 1970.

Special employment-oriented training courses have been developed with the Department of Education designed to increase the employment opportunities for indigenous people and to permit them access to managerial positions. Meetings have been held with potential and existing industries to increase the employment of northern residents.

The Department has assumed responsibility for the 14 co-operatives and credit unions in operation in the Mackenzie District and new training programs were developed to increase the efficiency and productivity of the co-operatives.

*Tourism Division.* The 1969 tourist season established new highs, with the number of visitors estimated at 9,000 and their expenditures at more than \$3 million, compared to 6,500 visitors and expenditures of \$2,100,000 in the previous year.

Extensive promotion, through the use of the polar bear symbol and the related "Explore Canada's Arctic" resulted in increased interest in the Northwest Territories.

*Game Management Service.* Total value of furs produced in the Northwest Territories for the 1968-69 fur year, which ended on October 31st, was estimated at \$1,180,000 compared with \$853,200 in 1967-68.

The Trappers' Assistance Program, designed to encourage game harvesting, is gaining greater acceptance. Trappers using the Fur Marketing Service during the year made considerable economic gains.

Aerial surveys were carried out in various zones to further assess the big game resources, for future management purposes. Several hunts were organized to involve the local indigenous people in the harvest of big game resources, primarily caribou, to supply settlements with meat.

## **Information Services**

### **Responsibilities**

To inform the people of the Northwest Territories of the Government's policy, programs and plans for the future, and residents of the rest of Canada and other parts of the world of the Territorial Government's programs and of current developments in the Northwest Territories.

### **Review of 1969 Operations**

In the year under review, more than 100 press releases were issued. In addition, the Information Services provided a summary of each day's activities during the sittings of the Council of the Northwest Territories for distribution to northern news media so as to include those which were not represented at the sessions.

## **Legal Services**

### **Responsibilities**

Provision of legal services to the Territorial Executive and senior officers of the different departments of the Public Service; adviser to the Council of the Northwest Territories.

## **Personnel Services**

### **Responsibilities**

Supervision of and development of employee functions and opportunities within the Territorial Public Service.

# **GOVERNMENT OF THE YUKON TERRITORY**

## **GOVERNMENT OF THE YUKON TERRITORY**

### **COUNCIL OF THE YUKON TERRITORY**

#### **Responsibilities**

To exercise legislative powers comparable to those of a provincial legislature.

#### **ADMINISTRATION OF THE YUKON TERRITORY**

#### **Responsibilities**

To administer the Yukon Territory in accordance with the Yukon Act and other federal laws applicable thereto, and the Ordinances of the Yukon Territory.

#### **Review of 1969 Operations**

The Council was called for three sessions: the first, January 30 to February 5; the second, March 10 to March 24; and the third, November 13 to December 18.

During the first session, five Ordinances were passed including the Financial Agreement Ordinance, 1969, and the Plebiscite Ordinance.

During the second session, eleven Ordinances were passed, including amendments to the following Ordinances — Taxation, Garnishee, Wills, Civil Emergency Measures, Vocational Rehabilitation of Disabled Persons, Labour Standards, Judicature, Motor Vehicles, Game and Fuel Oil Tax.

During the third session, seven Ordinances were passed including amendments to the following Ordinances — Fuel Oil Tax, Insurance, Judicature, Protection of Forests and Social Assistance.

#### **TERRITORIAL SECRETARY AND REGISTRAR GENERAL**

#### **Responsibilities**

The Territorial Secretary holds appointments as the Registrar General for: vital statistics; joint stock companies; corporation securities; societies; co-operative associations; and motor vehicles.

The Territorial Secretary upholds the duties of Registration Clerk, Clerk of the Council, Queen's Printer, Labour Provisions Officer, Workmen's Compensation Officer, directly supervises the office of the Public Administrator and is responsible for the Revision and Consolidation of Ordinances.

#### **Review of 1969 Operations**

Under the Motor Vehicles Ordinance, 18,858 licenses, certificates, registrations, etc. were issued as against 11,458 last year.

Under the Business Licence Ordinance and Insurance Ordinance, 667 licences were issued.

Under the Vital Statistics Ordinance, 454 births, 107 deaths and 168 marriages were recorded.

Under the Bills of Sale Ordinance, Conditional Sales Ordinance, Assignment of Book Debts Ordinance, Garagemen's Lien Ordinance and Partnership Ordinance, 3,776 documents were registered.

Under the Companies Ordinance, 78 companies were new Yukon incorporations and 158 were registered as extra-territorial companies.

Under the Societies Ordinance eight new societies were incorporated.

The Public Administrator handled a total of 48 files current as of January 1, 1969. In the course of the year, 43 deceased persons, 11 insane persons and five missing persons files were opened while files were closed for 30 deceased persons, 11 insane persons and three missing persons, leaving a total case load of 63 files at December 31, 1969.

Under the Workmen's Compensation Ordinance there were 1,180 accidents during 1969 and 685 injuries during the same period.

#### LEGAL ADVISER

The Legal Adviser provides legal advice and services to the Commissioner, Territorial Council and Departments of Government as required.

The drafting of legislation is now almost entirely carried on in the Yukon Territory but the services of the Drafting Section of the Department of Justice are still available and made use of as the need arises.

#### TERRITORIAL TREASURER AND COLLECTOR OF TAXES

##### Responsibilities:

Management of the Yukon Consolidated Revenue Fund and supervision, control and direction of all matters relating to the financial affairs of the Territory.

##### Long-Term Plans

1. Electronic data processing.
2. Establishment of a statistical section to provide data as required, to assess the coverage of statistical surveys, to assist in implementing new surveys and to advise local agencies in compiling data.

#### Review of 1969 Operations

Operations for the fiscal year ending March 31, 1969, may be summarized as follows:

	Surplus or (Deficit)
Operation & Maintenance	\$ 1,356,351
Capital	( 67,235)
Loan Amortization	493,004
Overall Surplus	1,782,120

## Operation and Maintenance

The operating Deficit Grant of \$4,611,901 received from the Federal Government proved to be in excess of requirements by the sum of \$1,356,351. This excess resulted from territorial revenues reaching higher levels than anticipated and expenditures lower. Increased activity in the Yukon Territory and upward revision of taxation rates and licence fees accounted for higher revenues.

## Project and Loan Capital

Receipts and disbursements during the year were as follows:

Expenditure	\$ 5,288,753
Receipts:	
Recoveries \$1,683,079	
Capital	
Borrowing 3,538,439	5,221,518
Surplus or (Deficit)	( 67,235)

Against the expenditure of \$5,288,753 the sum of \$1,683,079 was recovered principally under agreements and arrangements with the Federal Government. Capital borrowings of \$3,538,439 fell short of requirements by \$67,235.

## Loan Amortization

Details of receipts and disbursements for the year were as follows:

Receipts	\$1,096,723
Repayments	603,719
Surplus	493,004

Receipts represent Loan Amortization Grants of \$1,002,667 received from the Federal Government and interest on municipal and housing loans. Repayments refer to interest on Government of Canada Loans, instalments against which were made during the year.

## General

The year under review marks the end of the Federal-Territorial Financial Relations Agreement 1967-69, and the operating result for that period is summarized hereunder:

Operation and Maintenance surplus	\$1,074,005
Capital deficit	( 177,308)
Loan Amortization deficit	( 69,413)
Overall net surplus	827,284

The fiscal agreement for the preceding five years, namely 1962-67, terminated with an operational surplus for the period of \$1,332,292. These two surpluses combine to form a cash figure of \$2,159,576 which represents the major portion of our working capital.

### Plans for 1970

Conversion of Payroll Section to Electronic Data Processing and establishment of Central Purchasing.

### YUKON HOSPITAL INSURANCE SERVICES

#### Responsibilities

Administration of the Yukon Hospital Insurance Services. Briefly, this provides for the following:

*In-patient services.* Standard ward care in an approved hospital either within or without the Yukon Territory at the approved per diem rate of the hospital concerned, except in the case of hospitals outside Canada when a maximum of \$40.00 per day will be paid.

*Out-patient services.* Includes laboratory and other diagnostic procedures, necessary nursing services, drugs and related preparations, operating room and anaesthetic facilities and routine surgical supplies.

#### Long-Term Plans

Take-over and administration of all hospital facilities in the Yukon Territory.

### Review of 1969 Operations

This review is based on operations for the calendar year ending December 31, 1969 (hospital fiscal year).

The gross expenditure on Yukon Hospital Insurance Services totalled \$1,055,268.41.

In-patient services	\$1,029,197.60
Out-patient services	11,732.00
Administration	14,338.81
	\$1,055,268.41

Recoveries from the Department of National Health and Welfare and the Department of Indian Affairs and Northern Development amounted to \$649,825.80, resulting in a net expenditure of \$405,442.61 for the period under review.

Details of services provided during the calendar year 1969 are as follows:

	Within Territory	Outside Territory	Total
Adult and Children	18,571	9,815	28,386
Patient days	2,413	272	2,685
New Born Patient days	1,950	6	1,956

An increase was noted of some 36 per cent over the previous year in the number of patient days provided by this Service. However, the resulting increase in costs was not so high, being only 23 per cent. The increase in patient days is attributable to population growth, the extent of which cannot be accurately determined until the next official census is taken. Indications are that the population growth will continue at a high level and that the demand for days of patient care will grow.

### Plans for 1970

To meet the increase in population and the demand for facilities, a new nursing station at Faro, to be operated by the Department of National Health and Welfare, was due to open in mid-January. This new four-bed facility will serve the Anvil Townsite. St. Mary's Hospital in Dawson City will be replaced by a five-bed nursing station. The latter station which will be of modular construction so as to permit rapid expansion should patient loan warrant this, is expected to open in June 1970.

To turn over to the Department of National Health and Welfare the administration of Mayo General Hospital and the Dawson City health care facility so as to unify hospital administration within the Yukon Territory.

## DEPARTMENT OF ENGINEERING

### Responsibilities

To construct and to maintain territorial buildings, roads and other public works.

### Long-Term Plans

To construct all buildings for the Department of Engineering and for other government departments of the Yukon Territory. To construct new roads, replace bridges and to improve existing roads. To maintain all territorially owned buildings and to maintain all roads in the Yukon Territory, with the exception of Alaska Highway and the Haines Road.

### Review of 1969 Operations

All roads in the Yukon Territory, with the exception of the Alaska Highway and Haines Road, were maintained by this Department at a cost of approximately \$2,035,000. Maintenance was carried out on 1,752 miles of road.

Road construction was undertaken on the Whitehorse-Keno Road between Miles 52 and 102, on the Stewart Crossing-Dawson Road between Miles 59 and 76, on the Canol Road between Miles 203 and 283 (N.W.T. border), on the Campbell Highway between Mile 0 and Mile 25. In addition, guide rails were installed on the Stewart

Crossing-Dawson Road and road surface treatment was carried out with the use of calcium chloride from Mile 0 to Mile 52 of the Whitehorse-Keno Road, bridges were replaced at Mile 28 and at Mile 81 of the Canol Road.

Engineering assistance was given to the Department of Municipal Affairs in connection with street construction, water and sewer installations, construction of wells and other items of a municipal engineering nature. Town planning and planning for extensions of subdivisions and settlements were also carried out.

A number of school construction projects were either completed or were started during the year. A senior citizens' home was constructed as were two firehalls. The construction of a Nursing Home in Dawson City and also the construction of a residence for multi-handicapped children at Whitehorse, commenced this year. The expenditure for the foregoing items during the calendar year was approximately \$3,544,000. One hundred and seventy-nine territorially owned buildings were maintained throughout the year.

### **Plans for 1970**

Reconstruction of the Whitehorse-Keno Road will continue between Mile 125 and Mile 213. Mile 0 to Mile 50 of the Stewart Crossing-Dawson Road will also be reconstructed to conform to approved trunk highway standards. A new bridge is planned over Nares Lake at Carcross which will assist mining companies between Carcross and Skagway and it will eventually become part of the proposed Skagway Road. The first year of a two-year project to construct an airport at Old Crow will commence. The value of the foregoing will be approximately \$1,900,000. Permanent grader stations will be constructed on the Boundary Road, on the Dempster Highway and on the Campbell Highway.

Water and sewer extensions will be made in Riverdale and the water system at Porter Creek will also be expanded.

## **DEPARTMENT OF MUNICIPAL AFFAIRS**

### **Responsibilities**

Providing municipal services in all unorganized areas in the Territory. Guiding and assisting unorganized communities in becoming organized municipalities. Maintaining an inspection service for, and providing assistance and advice to, municipalities in the Yukon Territory.

### **Long-Term Plans**

Formulate and establish a policy on the development of local government which will meet the general needs of the people in the whole of the Yukon Territory and the special needs of its citizens in specific areas.

### **Review of 1969 Operations**

On April 1, 1969, the Haines Junction Local Improvement District was established, bringing the total for such districts to three.

In the fall of 1969, the community of Faro became a reality and at present all municipal services are provided by this Department.

Serious consideration has been given by the local citizens to the possibility of achieving village status for Watson Lake and the Porter Creek subdivision. However, it is not expected that this will take place at an early date.

Extensive studies and consultations have been undertaken by the city of Whitehorse and various government departments in respect of proposals for extending the city's boundaries.

### **Plans for 1970**

It is hoped that the establishment of Faro, Porter Creek and Watson Lake as villages will become a reality, while it is expected that the city of Whitehorse boundary extension will take some definite steps towards the fulfillment of its objective.

The following important subjects will be started or completed:

- a) Revision of the Municipal Ordinance;
- b) Study of the financial relationship between the Yukon Territorial Government and the municipal institutions;
- c) Revision and updating of the Whitehorse Metropolitan Plan;
- d) Provision of development plans for the larger unorganized communities;
- e) Revision and updating of the Area Development Regulations; and
- f) Incorporation of Faro as a village.

In addition to the above, policies have to be established on the question of equalized taxation for municipal services and the equalization of costs for water and sewer services in the Yukon Territory.

## **ELECTRICAL INSPECTION**

### **Responsibilities**

To inspect all electrical wiring and to approve electrical appliances in public, industrial and commercial buildings throughout the Yukon Territory.

To check and approve all electrical plans and specifications for proposed public, industrial and commercial buildings.

To administer and to interpret the Electrical Protection Ordinance and to propose revisions thereto.

To meet public, civic, and private groups — also representatives of the electrical trade to give advice and information in connection with the Electrical Protection Ordinance and good practice in the electrical field.

To assist the Fire Marshal in investigations into the cause of fires.

To maintain records of all inspections made, to prepare estimates for the Electrical Section and to do such other miscellaneous office work as required.

#### **Long-Term Plans**

Upgrading of the electrical standards in the Yukon Territory so that they will conform to the Yukon Electrical Ordinance.

#### **Review of 1969 Operations**

Inspections of old and new installations were carried out in and around the city of Whitehorse and checks of all public buildings along the highways were completed. Reports were made on conditions found with recommendations to bring electrical wiring up to Canadian Electrical Code standards.

Checking of plans and specifications were carried out on requests submitted.

A great deal of time has been spent with electrical contractors and electricians throughout the Yukon Territory in interpreting the Canadian Electrical Code and checking installations to point out faulty wiring methods.

The Electrical Protection Ordinance has been drafted and is awaiting approval and signature of the Commissioner of the Yukon Territory.

Assistance to the Fire Marshal has been given on fire investigations.

Inspection records, estimates and blueprint work have been completed for the Electrical and Engineering Sections of the Yukon Territorial Government.

### **TERRITORIAL TAX ASSESSOR**

#### **Responsibilities**

The assessment of all property liable to taxation by the Territorial Government.

The supervision of assessment for the cities of Whitehorse and Dawson.

#### **Long-Term Plans**

The establishment of an assessment manual directly related to Yukon building costs.

#### **Review of 1969 Operations**

A general assessment of all the Yukon Territory excluding the cities of Whitehorse and Dawson was completed.

This assessment includes all territorial and federal property which are now shown on the Assessment Roll.

Mining improvements presently exempted were also valued.

## **Plans for 1970**

Supervision of the City of Whitehorse General Assessment.

Supervision of the City of Dawson General Assessment.

Completion of an annual assessment with the Territory.

The completion of the assessments of Dawson and Whitehorse will mean that all Yukon Territory will be at the same base level of assessment.

### **FIRE MARSHAL'S OFFICE**

#### **Responsibilities**

To implement the Fire Prevention Ordinance in the Yukon Territory and to formulate a program to upgrade the skills and equipment of the Fire Protective Services.

#### **Long-Term Plans**

As the Territory develops, to provide efficient fire protective services where deemed necessary. To reduce to a minimum the loss of life and property occasioned by fire.

To introduce regulations which will upgrade the fire prevention standards in all places of public assembly.

To formulate fire prevention educational programs within the Yukon Territory public schools and for the general public, by means of the news media, with special emphasis on fire prevention in the home and place of work.

### **Review of 1969 Operations**

New fire halls were opened in the following communities in 1969:

Porter Creek	Carcross	Ross River
Carmacks	Beaver Creek	Haines Junction
Destruction Bay		

New fire trucks were provided for Dawson City, Porter Creek, Mayo, Carcross, Watson Lake, Teslin, Ross River, Beaver Creek, Carmacks, Destruction Bay and a reconditioned vehicle for Faro Townsite. This vehicle will be replaced by a new truck in 1970-71.

Training schools were held for the various fire departments throughout the Yukon Territory resulting in a general upgrading of the operational skills of the volunteer fire departments.

Approximately 80 plans were received from government agencies and various companies. These were reviewed to ensure conformity with the National Fire Code, the National Building Code and the Fire Prevention Ordinance of the Yukon Territory.

Investigations were conducted by the Fire Marshal into all fires where a major loss occurred or where arson was suspected.

Regulations were formulated and submitted for approval covering:

Construction and installation of chimneys, vents, fireplaces and smoke pipes; fire safety and fire prevention in residential trailer parks; and installation of gas-burning appliances and equipment.

Seventeen thousand (17,000) pieces of fire-prevention literature were issued to the general public in 1969 to stimulate interest in fire prevention, further to which a trophy was procured and will be awarded on an annual basis to the public school deemed to have produced the best fire-prevention program of the current year.

The Yukon Territory Fire Marshal's office was accepted as a member of the C.S.A. Fire Safety Council in 1969 and also as a member of the Underwriter Laboratories of Canada.

## **LANDS AND HOUSING ADMINISTRATION**

### **Responsibilities**

To make loans under the Low Cost Housing Ordinance.

To administer, manage and control lands in the Yukon that have been placed under the control and management of the Commissioner.

To administer housing accommodation for staff members of the Yukon Territorial Government.

Under a type of urban renewal schedule, to clear areas of families who have "squatted" on Crown land.

### **Long-Term Plans**

To continue making loan money available to those people desirous of building a home in an area which is not presently surveyed by other lenders.

To gradually increase the Commissioner's control over larger areas of land in the Yukon and to recommend maintaining a good stock of serviced lots in Whitehorse.

To upgrade housing accommodation in the remote areas of the Yukon Territory and to gradually phase out government-owned accommodations in the Whitehorse area.

To continue the Squatter Removal Program.

## **Review of 1969 Operations**

Loans continued at a good pace and residential building standards were improved.

Early in September, the Lands Office became an integral section attached to Housing Administration and the office was moved to Building 204, Takhini.

In April, Housing Accommodation, formerly supervised by another department, was incorporated into the Accommodation Section. This increase of work and responsibility required the services of a housing officer who was hired for the task.

During the summer, the area known as Whiskey Flats was cleared of 16 families who were relocated and compensated for their buildings and inconvenience.

### **Plans for 1970**

It is believed that there will be considerable construction activity and numerous applications for loans are expected.

It is anticipated that more land and federal leases of land will become the responsibility of the Lands Section.

Several construction projects in the interior of the Yukon Territory have been planned for additional staff housing accommodation.

## **GAME DEPARTMENT**

### **Responsibilities**

This Department is responsible for the administration of the Game Ordinance, Fur Export Tax Ordinance, Migratory Bird Regulations and the Brands Ordinance.

The above involves the issuing of all licences and permits as well as inspection of big game outfitters' equipment under the actual working conditions in the field and enforcement patrols throughout the Yukon Territory. All trapline registrations and re-registrations are handled by this Department as well as a predator control program on a small scale. Applications for wolf bounty are also cleared through the game Department.

### **Review of 1969 Operations**

One hundred and forty-eight wolves were presented for bounty during the 1969 calendar year.

Our 1968-69 fur harvest by licenced trappers has resulted in 54,300 pelts being taken. Locally, these furs are valued at \$104,612.

During the 1969 big game season, our 21 outfitters accommodated 338 non-resident hunters. These hunters participated in 4,735 hunting days at an average rate of \$100 per day, resulting in approximately \$473,500. being paid to guides and outfitters.

There was a considerable increase in the number of infractions under the Game Ordinance and these were attended to. In conjunction with other duties, certain preliminary game surveys were attempted from the air with reasonable results.

### **Plans for 1970**

Plans for 1970 will result in more enforcement patrols and closer contact with trappers and outfitters and the public generally in all parts of the Yukon Territory,

and if the Canadian Wildlife Service undertakes the proposed game survey, the Department will assist when and where possible.

It is hoped to enlarge this Department by taking on additional personnel and opening at least two detachments outside Whitehorse, thereby providing more service to the public.

## **TRAVEL AND INFORMATION**

### **Responsibilities**

Promotion and development of the tourist industry in the Yukon Territory; and provision of information and publicity throughout North America and other parts of the world on other activities in the Yukon.

### **Long-Term Plans**

To take advantage of every opportunity to promote the Yukon Territory and thereby attract more visitors and commerce; to encourage, assist and co-ordinate the development and use of recreational resources, historic and tourist attractions.

### **Review of 1969 Operations**

In addition to four information centres operated in the Yukon (at Watson Lake, Haines Junction, Beaver Creek and Dawson City), two seasonal information centres were operated in northern British Columbia (Dawson Creek and Prince George) at strategic interception points.

Yukon's first official road map was published and filming was completed for the Department's first travel film.

Fifty selected travel agents were assisted during familiarization tours of Alaska and the Yukon Territory and numerous travel writers and photographers were assisted during their visits, with the results appearing in many publications throughout North America and in a few overseas countries.

Assistance was provided in hosting two major conventions in Whitehorse, the Northern Resources Conference, in April, and the Alaska Travel Promotion Association Convention, in September. It was the first time the ATPA had met outside of Alaska.

Yukon Bud Fisher completed another successful winter tour of promotion through many parts of the U.S.A.

A comprehensive inventory of historic sites was completed and 74 temporary signs erected at sites throughout the Yukon Territory.

During the 1968-69 fiscal year, a record number of inquiries were handled by the Department. The total of just over 40,000 was 11 per cent greater than the previous year. There were over 60,000 registrations at the information centres.

Tourist counts remained at the same level as the record high reached in 1968, despite several unfavourable factors. The industry is now valued at \$10 million annually, with a tourist count of about 140,000.

### **Plans for 1970**

The Department is embarking on its first comprehensive media advertising campaign and for the first time has obtained the services of an advertising agency. Conversion studies will be made to assess results of the various markets.

A Yukon Information Centre Office is to be opened in Vancouver to serve the West Coast of Canada and the United States. Plans are being made to re-open the information centre in Prince Rupert.

The Department's first travel film will be released this spring and new publications will cover accommodation, historic sites and canoe trips. Existing publications will be completely revised to handle the increasing variety of inquiries.

The Department's promotional efforts will put more emphasis on off-season travel, sports, fishing, hiking and mountain climbing.

The Department's photo library is being expanded and slide presentations are being worked out. Expansion of co-operative efforts with neighbouring areas in joint regional promotions is being arranged. Development of special events, attractions and museums are being promoted through liaison with organizations within the Yukon Territory.

Also in the planning stages, are promotion tours and exhibits for sports and travel shows.

## **YUKON REGIONAL LIBRARY**

### **Responsibilities**

Operation of a regional library system designed to give public library service to all parts of the Yukon Territory and to aid school library service in territorial schools.

### **Long-Term Plans**

To work towards providing, as closely as possible under territorial conditions, public and school library service at the level of accepted standards of library service.

### **Review of 1969 Operations**

With a stock of approximately 52,000 catalogued books, the library served 80 outlets in the various Yukon communities. 23,527 books were shipped to these outlets on a rotating basis, and 5,595 new books, added copies, and non-print library materials were catalogued. The members of the Whitehorse Branch Library borrowed 58,468 books during the year. The film library distributed 4,893 16 mm films throughout the Territory and these films were viewed by a total audience of 126,750 people.

## **Plans for 1970**

Planning will be carried out on a project to provide a Territorial Archives and some expansion of Regional Library facilities. A program will be developed to maintain the permanent records of the Yukon Territorial Government and to collect and preserve such private historical records of the Yukon as may be available. Architectural drawings of the plant necessary to support the Archives program will be prepared in time to begin operations in the period 1971-72.

### **DEPARTMENT OF PUBLIC HEALTH**

#### **Responsibilities**

Provision of a comprehensive Public health program to all residents of the Yukon Territory on a cost-shared basis with the Federal Government. This includes the operation of health care facilities throughout the Yukon. Medical and administrative advice is also given to Dawson City and Mayo hospitals, operated by the Yukon Territorial Government.

#### **Long-Term Plans**

Continuation of public health programs in line with population increases and public health problems. Advances in public health treatment.

#### **Review of 1969 Operations**

Capital Construction. Purchase and location of health trailers in Beaver Creek and Carcross. Construction of a nursing station commenced in Faro City, scheduled for completion in January 1970. Construction of a nursing station in Dawson City, to replace the present hospital, started in 1969.

A regular system of maintenance of the outlying stations was implemented and carried out by the maintenance department of the Whitehorse General Hospital.

Continued expansion of all public health programs; the increased incidence of tuberculosis and venereal disease required allocation of more staff time for these two particular programs. Medical evacuation plan: increasing usage has been made of this plan throughout the Yukon Territory, compared with previous years.

## **Plans for 1970**

Dawson City Hospital. A nursing station is presently under construction and, when completed, will be run by this Department and the present territorial hospital in Dawson City will be phased out.

Faro Nursing Station. Construction and completion date due in January or February of 1970. This will be operated as a five-bed nursing station.

Purchased Health Services. Consideration will be given to obtaining services of visiting specialists from the University of British Columbia on a regular and continuing basis. This arrangement, if completed, will replace the present arrangements with individual specialists.

#### Public Health Programs:

- a) commencement of a German Measles immunization program for females;
- b) continuation and expansion of rhesus immunization program;
- c) implementation of mumps immunization program;
- d) cervical smear program to be carried out by public health nurses;
- e) implementation of a child care program in outlying areas (this will involve home nursing and some first aid);
- f) recruitment of community health workers for the communities of Upper Liard and Ross River;
- g) consideration will be given to the recruitment of a third public health inspector;
- h) increased frequency of visits to outlying areas by the zone psychiatrist and zone psychologist; and
- i) appointment of a fifth public health nurse.

#### DEPARTMENT OF EDUCATION

##### **Responsibilities:**

To provide elementary and secondary educational facilities for the students of the Yukon Territory. Yukon elementary and secondary schools are operated in accordance with the provisions of the Yukon Schools Ordinance.

To provide technical and vocational training to students who desire to work in the expanding trades of the Yukon Territory.

To provide technical and re-training and re-education for the present Yukon labour force.

Provide a territory-wide recreation program.

##### **Long-Term Plans**

In general, the improvement and expansion of the present program and facilities to meet the needs of an expanding Yukon population. In particular, to develop a social science curriculum of the culture and history of the indigenous Yukoner.

#### **Review of 1969 Operations**

In September 1969, the Yukon school system, which consists of 22 schools and 222 full-time teachers, enrolled in excess of 4,000 students. Four of these schools offered senior secondary programs. Moreover, the kindergarten program which was initiated in 1968 continued with 26 kindergarten classes in operation. In the summer of 1969, a kindergarten instructress course graduated 22 instructors with interim certificates.

As the Yukon Territory does not have post secondary educational institutions, special grant and scholarship funds are provided to assist Yukon students to attend

institutions of higher learning in Canada and elsewhere. In the school year 1969-70, 118 Yukon students were attending 27 colleges, technical, business and nurses training institutions. During the year under review, all schools had school advisory committees popularly elected from each school attendance area. These committees have given, and are continuing to give, excellent advisory services.

### Plans for 1970

A new instructional material centre will start operation in the F.H. Collins Junior/Senior Secondary School, Whitehorse, in March 1970. The academic portion of the expanded building program of F.H. Collins will be ready by June 30. The new Faro 10-room elementary and Junior/secondary school is due for completion by June 30. The formal opening of the Chief Zzeh Gittlit school at Old Crow is set for opening in early March. Renovations are underway at Carmacks school which should be completed by April 1. The Department of Education is also studying the need for a full year training course for kindergarten instructors. The Department is also studying the possibility of introducing a native Canadian teacher training program.

Vocational and Apprentice Training Branch. The interest in vocational training and trade upgrading and updating training in the Yukon continues at a high level. Enrolments were at capacity on the standard courses provided at the Yukon Vocational and Technical Training Centre for both the February and September 1969 courses. In addition, a number of short-term courses of two weeks to three months duration were presented during the year at the request of specific trades and industries.

During the year, a series of Transport Driver Upgrading Courses were presented in response to the anticipated manpower needs of the mining industry. Six courses of three weeks' duration were presented in the spring months with a total of 150 trainees having attended and completed the program. Course content included: air-brake training; defensive driving; survival in the event of breakdown; preventive maintenance; driving practice; and driving regulations and Yukon driving conditions, in preparation for operating semi-trailer transports with gross vehicle weights up to 92,000 lbs.

The Basic Miners' Course of three months duration was developed and offered in April and again in December, 1969. A mine drift and stope has been developed by the Training Centre for training purposes and the trainees were able to perform the practical aspects of the trade under realistic working conditions. The course includes such operations as drilling, loading, blasting and mucking, together with related theory and the operation and care of auxiliary mining equipment.

The Heavy Equipment Operators' Course resumed again on October 1, 1969, after an eight-month suspension. As a means of preparing residents of the Old Crow community for employment on the construction of the airstrip at Old Crow, thirteen trainees from that settlement attended a Heavy Equipment Operator and Dump Truck Driver training course at the Training Centre. The adult education night school program has again shown that it serves a necessary function in the upgrading and updating needs of the work force. Over 760 persons enrolled in a total of fifty-one courses presented during the year at Whitehorse, Watson Lake and Dawson City.

During the year, Apprenticeship Training Regulations and Automotive Trade Regulations were approved, and have thus enabled the full implementation of apprenticeship in the automotive trade. Moreover, approval of the Apprentice Training Regulations has paved the way for the completion of individual trade regulations for heavy equipment mechanics, journeymen carpenters, industrial electricians and hairdressers.

## **RECREATION BRANCH**

### **Responsibilities**

To assist, in consultation with community, municipal and territorial groups and school authorities, in the development and implementation of comprehensive programs of recreation and to administer funds provided for this purpose.

### **Long-Term Plans**

Encouragement of local recreation councils to plan and operate programs suited to local needs and interests and to employ qualified staff wherever feasible.

Assistance in equalizing recreational opportunities in facilities, programs and trained leadership.

Development of recreation education and extra-curricular programs in schools.

Development of territory-wide associations of local recreational sports and school authorities and support of their programs.

## **Review of 1969 Operations**

The past year saw continued expansion of services to local and territorial recreation activities. Training projects planned or conducted by the Branch increased to 13 in a variety of sports as well as outdoor recreation, playground and camp counselling. A total of ten Yukon championship competitions received assistance, five of them — track and field, tennis, swimming, judo and schoolgirl curling — for the first time. Two new Yukon associations were formed for skiing and judo.

Highlight of the year was the participation of nearly one hundred Yukon athletes in six sports at the first Canada Summer Games in Halifax.

In November 1969, recreation became a branch function of the Department of Education.

## **Plans for 1970**

In 1970, the Recreation Branch will be involved in the Yukon's participation in the first Arctic Winter Games at Yellowknife, Northwest Territories, and later in preparing for the second Canada Winter Games at Saskatoon, in February 1971. Increased involvement in school recreation programs is foreseen, particularly from the start of the new academic year in September.

The Branch will initiate, in co-operation with three local authorities, installation and operation of the first of a series of portable swimming pools, to extend swimming and water safety instruction as well as added recreational opportunity to the smaller centres. Direct operation of summer activity programs in selected areas will also be considered.

Revised regulations to simplify administration of financial assistance to community recreation will be finalized during the year. A small beginning will be made on expansion of the Branch's assistance to non-physical recreation projects.

## **LIQUOR CONTROL**

### **Responsibilities**

The Liquor Department controls the importation, retailing and distribution of all alcoholic beverages within the jurisdiction of the Liquor Ordinance.

### **Long-Term Plans**

By controlling the licenced outlets, to upgrade the lodging and food establishments in the Territory, both for the travelling public and the residents and also to provide a monetary base for Governmental establishments.

## **Review of 1969 Operations**

The Whitehorse self-serve Government Liquor Store has proved to be a very successful unit and has established a new method of dispensing alcoholic beverages to the public.

The warehouse and licensee sales have continued to increase in volume and the necessary records in stock and ordering control have been maintained.

The four stores located in Dawson City, Mayo, Haines Junction and Watson Lake continue to service the areas of their locations in a dual capacity as Government Liquor Stores and Agencies of the Yukon Territorial Government.

Total gross sales for the period from April 1 to December 31, 1969 amounted to \$3,236,256 as compared with the sum of \$2,983,578 for the corresponding period in 1968, an increase of \$252,678.

The following licences were issued during the year:

Cocktail Lounge	30
Cabaret Entertainment	10
Beer Tavern	23
Dining Room	54
Off-Premises	36
Club	6
Canteen and Mess	8

## Plans for 1970

New self-serve stores are planned for Watson Lake and Faro, as well as the conversion of the Mayo Liquor Store to a self-serve unit. The new stores were to have been completed during the year 1969, but construction has been delayed until 1970.

The Department is examining the plans for warehouse facilities and expects to have a complete warehouse during the 1970 fiscal year.

A new, far-reaching Ordinance is before Council and is expected to become law early in 1970. The Department is hopeful that inspectors will be appointed to enforce the Liquor Ordinance and Regulations pertaining thereto.

The Department is well aware of the probable need for outlets in areas that are in the process of being or will be developed with the increased mining activity in the Yukon Territory. These will be phased in as conditions permit.

## DEPARTMENT OF SOCIAL WELFARE

### Responsibilities

The Department of Social Welfare administers a total public welfare program in the Yukon Territory. With the exception of services under the General Assistance Program, the Department provides a full range of social welfare services to the people of the Territory, Indian and white, who are in need of such services. Social Assistance to persons of Indian status is provided by the Yukon Indian Agency of the Federal Government's Indian Affairs Branch. Social Welfare programs presently administered by the Department are: general assistance; categorical assistance; family and child welfare services; and alcoholism services.

The Department is also responsible for the administration of: three senior citizens' homes; one nursing home; one children's group home; one children's receiving home; two district welfare offices; and a branch office in Whitehorse which accommodates the Social Assistance Division and the Alcoholism Services Division. Total staff during 1969 was 49, consisting of:

### Professional Staff

Program Direction and Administration	1 Director 1 Assistant Director
Family and Child Welfare Division	2 Unit Supervisors 4 Social Workers
Social Assistance Division	1 Supervisor 1 Social Worker
Field Offices	2 Area Social Workers
Alcoholism Services Division	1 Alcoholism Consultant
Home and Institutions	1 Supervisor

## Administrative, Clerical and Operating Staff

Departmental Administration	1 Administrative Officer 1 Accountant
Clerical and Stenographic	10 Staff
Nursing Home Operation	17 Staff
Senior Citizens' Homes	3 Staff
Group Home	3 Staff

The Department is responsible for the administration of the following Territorial legislation: Social Assistance Ordinance; Child Welfare Ordinance; Old Age Assistance and Blind Persons' Allowance Ordinance; and Disabled Persons' Allowance Ordinance.

In addition to these statutory responsibilities, the Director, in his official capacity of Director of Child Welfare, has certain defined responsibilities under the new Ordinance to provide for the welfare of children.

### Long-Term Plans

In general, the Department plans to continue the development of constructive social welfare programs, to raise standards of service and to continue planning for the expansion of programs and the development of new services necessary to meet changing conditions and needs.

Continued expansion of group home and other child care facilities in order to meet the vital need of the variety of resources required for the increasing number of children coming into the protective care of the Department, particularly the specialized facilities that are needed for emotionally disturbed and multi-handicapped children.

To continue the development of a broad program of services together with the establishment of the necessary facilities designed to meet the needs of our aged people.

The continuation of a public housing program, established in 1967, and designed to alleviate hardship and suffering in the poverty stricken group, with the purpose of improving their deplorable living conditions and endeavouring to reduce the high incidence of disease and social problems amongst this group of people.

The development of a fully integrated social welfare program for all residents of the Yukon by means of an extension of the existing Territorial Social Assistance program to registered Indians.

### Review of 1969 Operations

A more extensive coverage of the Territory was provided, the full range of social services having been extended to all areas. A better level of service is now being extended to outlying areas as the result of an increase in field trips by social work staff from the main office in Whitehorse and by area social workers in Dawson City

and Watson Lake. Generally, much progress has been made during 1969 in all areas, and a high standard of service has been maintained in the administration of the total program.

Construction of the new 23-suite Senior Citizens' Home located in Whitehorse was completed in late 1969 and opened in February 1970. The home is designed to provide 23 units capable of accommodating married couples and single persons for a total capacity of 46. Ten units are completely self-contained with kitchenette facilities and 13 units are without kitchenettes. The occupants of these units will make use of congregate feeding facilities where meals will be provided.

Construction of a group home for multi-handicapped children is now in the final stages of construction and presently staff to care for six to eight children are being recruited. The first Children's Group Home completed its first year of operation in July 1969. This is a specialized child-care facility that provides a treatment program in a group-living situation for 12 adolescent children with behavioural problems.

Tenders for the construction of a Boys' Group Home have been called and it is anticipated that construction will commence early in 1970.

The first Children's Receiving Home was opened in Dawson City. The Department carries the responsibility for placing children in substitute care when they must be removed from their own homes, either voluntarily or through court action. Foster homes are always taxed to the limit and in some areas are non-existent and there is a drastic need for a holding or receiving unit which would be used for emergency care, for short-term placements and for assessment when children must remain in care for an indefinite period.

The Department has embarked upon an extensive foster-home and adoption-home finding program with the view to establishing more placement resources for children in wardship care and finding more adoption homes for the increasing number of children being relinquished for adoption. As a result of this program both foster homes and adoption homes have increased and an active foster parents association is involved with the Department in shaping policy for improved services to children and their foster and natural parents.

Negotiations with the Federal Department of National Health and Welfare and the Yukon Territorial Government were concluded with respect to the Canada Assistance Plan. The agreement was signed by the Commissioner, and the Minister of National Health and Welfare, the Honourable John Munro, December 16, 1967. The Canada Assistance Plan will result in a broadening and strengthening of the Social Assistance Program. The three Ordinances to provide for the protection of children, the granting of adoptions and services to unmarried parents were re-written and progressive policy was incorporated into the legislation to form an omnibus act entitled Child Welfare Ordinance.

### **Plans for 1970**

It is planned to review program policies and practices and effect changes or improvements where these are found to be necessary, thereby raising standards of service to a high level with the ultimate objective of developing a positive and

effective program of social services for the people of the Yukon Territory. In particular, a careful review and examination of workloads in the district welfare offices, as well as a study of existing social problems in these areas will be carried out to determine to what extent field staff will have to be strengthened in order to provide adequate coverage and meet anticipated demand for increased social services as the result of the extensive mining activity and proposed development of new townsites in the areas served by these district offices.

In view of the lack of placement resources and the increased activity in our child-care program, it is planned to develop a variety of resources for children admitted to the care of the Department so that their needs can be adequately met. The establishment of these needed resources will add to the quality and effectiveness of the total Child Welfare Program. Because of the variety of problems involved and the varying age ranges of the children needing specialized settings, planning will be oriented toward the development of family group homes, group homes and boarding homes for adolescents in need of supervision because of behavioural problems, and facilities for multi-handicapped children. The Department will continue its efforts to encourage private groups experienced in child care to come to the Yukon to establish more child care facilities and ideally, to operate any government-owned facilities for children. It is hoped that our efforts will be successful and that the pressing need for sufficient and adequate facilities can be met by both government and private groups dedicated to providing for the welfare of children.

## DEPARTMENT OF CORRECTIONS

### Responsibilities

Provision of adult and juvenile probation services. In addition to providing this service to the courts, supervision of parolees and probation transferees from federal and provincial institutions and jurisdictions is also undertaken.

Operation of a juvenile training home for male juveniles declared by the courts to be delinquent.

Operation of a medium security institution, which consists of arranging for the custody, care and treatment of those people who have appeared before the Territorial Courts and have been remanded or sentenced to terms of imprisonment of less than two years.

### Long-Term Plans

Present growth trends in the Yukon Territory indicate that planning along the following lines should be made:

Probation services will need to be expanded with community involvement by volunteer probation workers.

Juvenile training home facilities will be extended to cater to girls adjudged to be delinquent.

The physical plant at Whitehorse Correctional Institution should be sufficient to cater to sentenced inmates for the next ten years, once presently planned alterations have been completed, in spite of an expected rapid population increase in the Yukon Territory. The medium security facilities will be used as a clearing house where inmates will be classified and those considered suitable will be used to man mobile trailer units engaged in specific work projects.

### **Review of 1969 Operations**

In the calendar year 1969, a total of 542 inmate admissions were recorded, broken down as follows:

Males	354 Sentenced
	99 Remanded
Females	83 Sentenced
	6 Remanded

Experiments were conducted in growing vegetables within the Institution's grounds, with encouraging results. Potatoes, turnips and cabbages were the vegetables most successfully grown.

Considerable progress was made in furthering the clearance of the Chilkoot Trail with three full months of work undertaken.

In June 1969, the Yukon Mobile Institution was used, in part, as a temporary detention facility for juveniles. In November, the entire facility was established as a juvenile training home for delinquent boys. It is functioning as a detention centre cum-training home to cater to local needs.

In November 1969, Adult and Juvenile Probation Services were combined and, along with responsibility for juvenile training, came under the jurisdiction of this Department, having been a Branch of the Department of Social Welfare since January 1967.

### **Plans for 1970**

Continued use of inmate work crews will be made on outside work projects. These will be in a minimum security setting and, with the delivery of the first mobile trailer units, it will be possible to operate in more remote parts of the Territory and not be restricted to the area immediately around Whitehorse.

The Juvenile Training Home, which is located in a minimum security camp setting, will be added to by building log cabin style cottages to house girl juvenile committals.

### **OFFICE OF THE SUPERVISOR OF LANDS**

The general land activities of leasing and sale of Crown lands were quite substantial again this year in the Yukon Territory.

The greatest change appeared to be in the number of inquiries and applications for agricultural land. Although a number of the areas applied for were not large there is a definite trend for people to state that they are interested in trying to be

self-supporting by breaking land and planting crops for their own use and perhaps to support one or two horses, cows and some chickens.

There were some applications and many inquiries for land along the Alaska Highway for commercial purposes.

The applications for residential lake front property are always present and applicants are looking for such property farther from Whitehorse every year. As roads and transportation improve, people are travelling faster and farther afield.

During 1969, there were, on the average, about 25 land inquiries, some from Canadians, but mainly from Americans and a few Europeans for information on the availability of land, our regulations and the possibility of moving to the Yukon. Quite a few have mentioned that they had holidayed in the Yukon, liked what they saw and now wanted information about living conditions.

Federal lands revenue for the year:

Land Rentals	\$15,669.56
Sales	17,733.30
Fees	902.00
Quarry Royalties	3,358.10
Custom Printing	122.37
Notification	170.00
Order-in-Council	210.00
	\$38,165.33

## DEPARTMENT OF PERSONNEL

### Responsibilities

The Personnel Department is responsible for the administration of the Public Service Ordinance including classification and pay administration and staff establishment control, the recruitment function and appointments to the public service, employee appraisal and development, and for the interpretation and application of all personnel orders and regulations.

### Long-Term Plans

Long-term plans for the Department include the development and co-ordination of a comprehensive program of manpower planning and utilization including employee appraisal, training and development.

### Review of 1969 Operations

During the 1969 calendar year, emphasis was placed on the basic personnel functions of recruitment, classification and pay administration, regulation promulgation and administration and the maintenance of a variety of personnel records.

The recruitment program saw 155 permanent appointments and 321 casual appointments for a total of 476 appointments to the service made through the

Personnel Department. To assist in determining causes of employee turnover, an exit interview program was implemented. This program provides feedback from employees on personnel and other governmental policy and practices and provides employees with information pertinent to separation from the service.

In April 1969, appropriate changes, which were later implemented, were recommended in the pay and fringe benefit package. The classification and pay program assumed a higher order of sophistication with the appointment of a classification and pay officer late in the calendar year.

A limited training program was maintained consisting of payment for correspondence courses taken by employees and sending middle-management representatives to a variety of short programs of study sponsored by other governmental or educationally oriented institutions. With the implementation of an educational leave policy, one candidate returned to university to complete a Masters Degree in Social Work.

### **Plans for 1970**

With much of the groundwork accomplished in 1969, the implementation of collective bargaining for employees in the public service is anticipated in 1970. In this respect, the "permanent" casual component of the service will have to be regularized, the Public Service Ordinance amended, a collective bargaining ordinance will have to be passed by Council and our Public Service Regulations will have to be reviewed and updated to reflect current employment practices.

# **NATIONAL FILM BOARD**

## NATIONAL FILM BOARD

### Responsibilities

The production of motion pictures, still photos, filmstrips, slide sets and related audio-visual materials dealing with the Canadian North, its people and their activities, its industries and resources, economic and social developments; the distribution of this material in Canada and abroad and the distribution to northern communities of films interpreting Canada and films in the national interest; service to Canadian government departments and agencies in the form of advice in the use of audio-visual media and in the planning and production or procurement of film for informational, instructional, training and promotional purposes.

### Long-Term Plans

Normal planning to carry out these tasks.

### Review of 1969 Operations

#### Film Production

The following projects were carried out for the Department of Indian Affairs and Northern Development:

NORTH. A theatrical short film to promote tourist travel was completed and distributed in cinemas and in 16mm version;  
a theatrical short film on northern resource development was in production;  
a major film on wolves was filmed largely in the north;  
a film about the Canadian Wildlife Service is in production and contains much northern material;  
one of a series of television public service clips dealt with the role of the Hudson's Bay factor in the development of Canada;  
production continued on four filmstrips about northern co-operatives; and  
a feature length film about man living in the cold regions around the world was in production, sponsored jointly by the Board and the Department.

The following projects were undertaken under other sponsorship as indicated:

Indian Christmas, a film made from still photos — N.F.B;  
The Land, a film for Canadian Pavilion at Osaka;  
Eskimo Art, a theatrical short, to be completed in 70/71 — N.F.B; and  
Passage au Nord-ouest — The Manhattan Odyssey, two films on the first Arctic voyage of the *Manhattan* — one for television, the second for theatres; sponsored by the Board and a group of departments.

An Indian film crew directed by Roy Daniels shot 8mm footage, took colour slides and recorded points of view in the Yellowknife area as part of the inter-departmental "Challenge for Change" project.

#### Still Photography

Photographer Terry Pearce carried out assignments in the Arctic, the results of which were added to the Still Photo Library.

Photostory 501 "Canada's Arctic Unfolded", was released to the press at home and abroad in November. It dealt with the developments over the past 20 years which have made the region accessible.

### **Film Distribution**

Distribution in the Yukon Territory is done principally by the Yukon Regional Library in Whitehorse which has 850 films. In 1969 it recorded 5,191 film bookings. The N.F.B. Vancouver office supplies 300 prints on long-term loan and fills requests for individual subjects not available in the Yukon Territory.

The MacKenzie District is served in a similar way by the N.F.B. Edmonton office, working through the Territorial Film Library at Fort Smith. Films are supplied directly from Edmonton to specialized users such as the Yellowknife Film Society, the Correctional Institute and Frontier College workers at Fort Resolution. It also assisted the Arctic Winter Games Corporation in arranging a film festival in Yellowknife.

The area north of Manitoba as well as DEWline stations are served from the Board's Winnipeg office and from libraries at Flin Flon and Thomson. The T.V. services at Churchill receive films direct from the N.F.B. Winnipeg office.

The region north of Ontario is served by the Board's office in Thunder Bay.

The area north of Quebec is served by the N.F.B. office in Quebec City.

The Board's office in Newfoundland provides an extensive service to the northern communities which can be reached from St. Johns.

The Board's Outpost Library of 2,300 films, located in Montreal, provides the main service for isolated communities in the far north. Some 75 films are shipped monthly, for return three months later.

### **Plans for 1970**

#### **Film Production**

The theatrical short on resource development is to be completed in early summer; the feature length film on man in cold regions, is to be finished in the fall; the same applies to the film on wolves and the film on the Wildlife Service.

A film for the Department of National Defence is to be made on the work of the Armed Forces in the North, and the Board plans to produce a theatrical film about the Canadian coastline — Atlantic, Arctic, Pacific.

Films are to be shown in Aklavik in connection with the McKenzie Delta Research project and if conditions are appropriate, locally produced material will be used to advance that project.

The major film on oceanography will contain material on the Arctic Ocean.

A program of films and other visual aids dealing with pollution will include material on the North.

### **Film Distribution**

The N.F.B. Northern Service will operate as it did in 1969 with the addition of new titles. It will be extended as the availability of power, transportation and funds permit.

The Board has no year-round establishment in the North and employed no one directly in the North in 1969. No change is foreseen in 1970. Film crews and distribution personnel travel to the North as required.

# **NATIONAL MUSEUMS OF CANADA**

## NATIONAL MUSEUMS OF CANADA

### NATIONAL MUSEUM OF MAN

#### Responsibilities

Investigations relating to the archaeology, physical and social anthropology, ethnology and history of the North and the collection, preservation and display of specimens required for research and public information.

#### Long-Term Plans

Normal planning to meet responsibilities.

### Review of 1969 Operations

#### Archaeology Division

Field Work in Yukon Territory and Northwest Territories, 1969. The Archaeology Division fielded eight northern research parties during the summer of 1969. Four of these parties were headed by officers of the Division, while four others were financed by contracts from the Archaeology Division. Each of these projects is summarized below.

*Field parties led by officers of the Division:* Dr. Donald Clark did archaeological surveys in the vicinity of Norman Wells, Great Bear River and Colville Lake, District of Mackenzie, Northwest Territories. One field assistant was hired from the south. A total of approximately \$2,000 was spent in the Yukon Territory and the Northwest Territories.

Dr. Robert McGhee did archaeological surveys and excavation in the vicinity of Tuktoyaktuk, Northwest Territories. Transportation and logistic support was provided by the Polar Continental Shelf Project. One assistant was hired from the south. Approximately \$1,000 was spent in the Northwest Territories.

Dr. W.N. Irving did archaeological surveys and ethno-historic research at Dawson and Old Crow, Yukon Territory. No assistants were hired and approximately \$1,000 was spent.

Dr. J.V. Wright excavated an archaeological site in central District of Keewatin, working out of Baker Lake, Northwest Territories. No assistants were hired and approximately \$1,000 was spent.

*Field parties under contract:* Mr. J. Cinq-Mars, graduate student at the University of Wisconsin, did an archaeological survey of the Porcupine River, Yukon Territory. He hired no assistants and was financed by a contract for \$3,900.

Mr. A. McCartney, graduate student at the University of Wisconsin, excavated an archaeological site near Chesterfield Inlet, District of Keewatin, Northwest Territories. He hired four field assistants from the south and worked with a contract for \$7,000.

Dr. J.V. Millar of the University of Saskatchewan fielded a party engaged in excavating a site at Fisherman's Lake, District of Mackenzie, Northwest Territories. One assistant was hired from the south, local labour was used to a limited extent and the work was done on a contract for \$1,000.

Dr. W.C. Noble of McMaster University did an archaeological survey at the eastern end of Great Slave Lake, Northwest Territories. One assistant was hired from the south and the work was done on a contract for \$2,000.

Total amount of money spent in the Yukon Territory and Northwest Territories: \$19,000 (estimated). Labour hired from the south: three man-years (estimated). Labour hired from the north: 0 man-years (excluding casual hiring for transportation).

### **Ethnology Division**

The responsibilities, long-term plans, 1969 operations and plans for 1970 are set out separately hereunder.

#### **Responsibilities**

Ethnographic research, salvage, preservation and display.

#### **Long-Term Plans**

To execute a comprehensive ethnographic research and salvage program for collection, evaluation and publication of information on the social, linguistic and material culture of the Eskimos and Indians of the Yukon and Northwest Territories and northern part of the Provinces, in order to preserve their earlier traditions. The program will continue to be directed by staff members from the Ethnology Division, but a major part of the continuing field work will be accomplished by contract ethnologists and will employ Eskimo and Indian assistants for short periods during each field year.

### **Review of 1969 Operations**

Ethnological study, collection of specimens for a full-scale Eskimo diorama and field consultation with display technicians was performed by one staff member for four months at Baker Lake, Northwest Territories. One staff ethnologist continued the study of Indian culture in northern Manitoba for six months and a second collated and analyzed data on Eskimo social organization gathered over several past years among the Iglulik, Netsilik and Copper Eskimos. Under contract, an Eskimo from Baker Lake transcribed and translated Caribou Eskimo oral traditions at the National Museum of Man and another recorded Labrador Eskimo oral traditions at his home village. Two contract ethnologists conducted field work among the Eskimos at Iglulik, Northwest Territories and in Labrador; one contractee with two assistants continued research among the Athapaskans in the Mackenzie District; three carried on Indian studies in the northern part of the Provinces. Institutional resources were utilized by seven additional contractees for studies of groups in these areas. The average period of research for each of the contract studies was three months.

### Plans for 1970

Ethnology Division staff members will undertake field research for four months in the Arctic and Subarctic and four months in the northern part of the Provinces. Contract research in ethnology relating to the North is expected to be similar to that of 1969.

**NATIONAL MUSEUMS OF CANADA**  
**NATIONAL MUSEUM OF NATURAL SCIENCES**  
**BOTANY DIVISION**

**Responsibilities**

The Botany Division of the National Museum of Natural Sciences has an overall interest in botanical exploration and research in Canada's North. The National Herbarium contains important collections of plants made in the Arctic during the past century. From time to time members of its scientific staff (curators and botanists on contract assignments) carry out field studies in the North. In addition, botanists from other institutions, both in Canada and abroad, regularly deposit original or duplicate sets of specimens in the National Herbarium.

**Long-Term Plans**

The Botany Division plans to continue a general program of exploration, research and publication on the Botany of Arctic Canada and to co-operate with other institutions and individuals working in the same area.

**Review of 1969 Operations**

**Phycology Section**

Dr. R.K.S. Lee, Curator of Algae, conducted a continuing field project on the distribution and systematic biology of the Canadian Arctic marine algae. During the summer of 1969, intertidal and subtidal benthic specimens were observed and collected from various areas in Mackenzie Bay and the Sachs Harbour region of Banks Island. Physical data, including substrata, salinity and temperature, were recorded.

The work was carried out with logistic support from the Polar Continental Shelf Project's field base at Tuktoyaktuk, Northwest Territories.

**Plans for 1970**

Phycological research is expected to continue in the same general area as 1969. An attempt will also be made to reach areas in Amundsen Gulf and in Dolphin and Union Straits. Of historical note, the Canadian Arctic Expedition of 1913-18 explored these channels and made a few collections of algae. The 1927 report of this algal collection is the only published account on the marine flora of the western Canadian Arctic.

**NATIONAL MUSEUMS OF CANADA**  
**NATIONAL MUSEUM OF NATURAL SCIENCES**  
**PALAEONTOLOGY DIVISION**

**Responsibilities**

To collect and report on Pleistocene vertebrate faunal remains from the Yukon, with special reference to their stratigraphic and zoogeographic relationships and age.

**Long-Term Plans**

Continuation of field work in the Dawson and Old Crow areas of the Yukon during 1971 and 1972, with future emphasis on Pleistocene vertebrate localities in the Northwest Territories.

**Review of 1969 Operations**

Field work was not carried out during 1969, but collections of Pleistocene vertebrates from the Dawson and Old Crow areas of the Yukon were made through the co-operation of Dr. A. Lissey and Dr. O.L. Hughes of the Department of Energy, Mines and Resources. The year was spent in laboratory preparation and examination of specimens collected in the Yukon Territory during the previous three years.

**Plans for 1970**

Field work is scheduled for the western Yukon and Baillie Islands, Northwest Territories.

**ICHTHYOLOGY SECTION**

**Long-Term Plans**

The Ichthyology Section is undertaking in co-operation with the Fisheries Research Board of Canada a survey of the marine fish fauna of the Canadian Arctic between Alaska and Labrador, south to James Bay and north to the pole. This involves the collection of specimens and ecological data, systematic, zoogeographic, and biological analyses and will result in the publication of a book on the marine fishes of the area. The specimens are deposited in the museum's ichthyological collection.

**Review of 1969 Operations**

No field work conducted.

**Plans for 1970**

During the summer of 1970 plans are to spend four or five weeks in the vicinity of Frobisher Bay collecting shallow and mid-depth marine fishes. This work will be carried out in co-operation with Dr. J.G. Hunter, Fisheries Research Board of Canada, on board the M/V Calanus. We will be gathering specimens and photographs for our forthcoming book "Marine Fishes of Arctic Canada". Collecting will be done using trawls, gill nets, hand lines, etc.

NATIONAL MUSEUMS OF CANADA  
NATIONAL MUSEUM OF NATURAL SCIENCES  
VERTEBRATE ETHOLOGY SECTION

**Responsibilities**

The Zoology Division of the National Museum of Natural Sciences has broad interests in biological research in the Arctic, and a tradition of research and exploration in Canada's north. Its scientific collections of arctic material are among the best in the world. This Division maintains a cooperative attitude with other government agencies and scientists of other countries interested in understanding problems of the north.

The Vertebrate Ethology Section is undertaking detailed, long-term studies at Bathurst Island, N.W.T. which are intended to demonstrate the important interrelationships which exist between species of arctic animals and their behavioural adaptations which enable them to survive in high arctic environments. The small field station at Bathurst Island provides opportunities for university students to undertake research problems and promotes public interest and education in conservation in the High Arctic.

**Review of 1969 Operations**

Collaboration with the Polar Continental Shelf Project permitted the research program established at Bathurst Island, N.W.T. in 1968 to continue throughout the 1969 season. The full value of this research program can be realized only if the established projects can be continued for six more years. A continuous summer record of phenological events are essential. Detailed studies are being done on bird and mammal species which will provide evidence of interspecific relationships and adaptations to population fluctuations of prey species and weather. Behavioural adaptations and life histories are emphasized and represent the first of this kind of study of vertebrate populations to be undertaken in the High Arctic.

The 1969 operations included the following nine projects:

- 1) Ethology of the Rock Ptarmigan: conducted  
by S.D. MacDonald;
- 2) Ethology and Annual Cycle of the Sanderling  
by Dr. David F. Parmelee,  
Kansas State Teacher's College,  
Emporia, Kansas, U.S.A.;
- 3) Ethology and Ecology of Muskoxen  
by David R. Gray,  
University of Alberta,  
Edmonton;
- 4) Life History of Shorebirds,  
by Dr. George M. Sutton,  
University of Oklahoma,  
Norman, Oklahoma, U.S.A.;

- 5) Physiological Adaptations of Overwintering Insects,  
by Dr. Hugh Danks,  
Dr. R. Byers,  
Department of Agriculture;
- 6) Behaviour and Life History of Arctic Hares,  
by Philip Taylor,  
University of Alberta,  
Edmonton.  
(supervised by S.D. MacDonald)
- 7) Collection and Preparation of Animal and Plant Specimens for Taxonomic Study,  
by Parmelee, Taylor, MacDonald;
- 8) Collaboration with the Federation of Ontario Naturalists in the production of a  
High Fidelity Recording of Arctic Birds for the "Sounds of Nature Series",  
by MacDonald and Taylor;
- 9) Behaviour and Life History Study of Snowy Owls in Relation to Lemming Populations,  
by Taylor.

#### Plans for 1970

Projects numbered 1,2,3,5,7,8 and 9 will continue, with number 3 being supported by the Canadian Wildlife Service.

Surface weather observations will be continued, but with equipment supplied by the Department of Transport. Additional records will be included in the interests of obtaining data comparable with the Resolute Bay and Meighen Island meteorological stations.

New projects to be added this season are:

- 1) Competition and Adaptive Behaviour of Three Species of Jaegers Related to Lemming Populations, by Taylor and MacDonald;
- 2) Census of Breeding Populations of Arctic Birds, and Life History Study of the Purple Sandpipers, by Harold M. Mayfield, Toledo, Ohio;
- 3) Breeding Behaviour of the King Eider with Emphasis on Visual and Aural Communication, by MacDonald and Gill;
- 4) Population Studies of the Collared Lemming, by David A. Gill, National Museum of Natural Sciences.

**NATIONAL MUSEUMS OF CANADA**  
**NATIONAL MUSEUM OF NATURAL SCIENCE**  
**CURATOR OF MAMMALS**

**Long-Term Plans**

Future fieldwork in mammalogy should include investigations in arctic and subarctic regions with emphasis on collecting in Alaska, Yukon, Northwest Territories, Ungava and, hopefully Siberia.

The primary focus of research will be on holarctic and Beringian relationships of key species utilizing cytogenetic, serological, bio-acoustic and traditional skin and skull methodology.

**Review of 1969 Operations**

Mr. David Gill and Mr. David Campbell collected mammals at Paulatuk, Kidluit Bay, Herschel Island, Atkinson Point, Banks Island and Tuktoyaktuk. Approximately 370 specimens were collected as well as ectoparasites, serum and archaeological material.



# **NATIONAL RESEARCH COUNCIL**

## **NATIONAL RESEARCH COUNCIL**

### **Responsibilities**

Investigations into various phases of pure and applied sciences in northern Canada.

### **Long-Term Plans**

Several Divisions of the National Research Council have a continuing interest in the North.

The Division of Physics is involved in two programs in northern Canada; ground-based cosmic ray observations and rocket studies of charged particles in the magnetosphere.

The Division of Building Research conducts studies of permafrost, snow and ice and northern building problems.

The Radio and Electrical Engineering Division carries out radio and optical measurements of upper atmospheric phenomena, for example, auroral and air glow observations.

The Space Research Facilities Branch operates the Churchill Research Range, the Great Whale Geophysical Station and a launching facility at Resolute Bay, and coordinates scientific programs undertaken at these facilities.

The Division of Mechanical Engineering is concerned in two programs in the transportation field: VTOL aircraft for commercial air transportation for the late 1970's and beyond, and air cushion vehicles for northern transportation.

Other Divisions of the National Research Council become involved periodically with northern work on a short-term basis.

## **Review of 1969 Operations**

### **Division of Physics**

Continuous monitoring of cosmic ray intensities was carried out at five stations in northern Canada (Resolute, Churchill, Alert, Inuvik and Goose Bay). This work is part of an international program based on a network of cosmic ray stations and is carried out in collaboration with Atomic Energy of Canada Limited, Chalk River, and the Southwest Center for Advanced Studies, Dallas, Texas. During the past year some monitors at Resolute and Churchill have been closed down.

During 1969 experiments were flown on eight rockets from Fort Churchill and Resolute Bay. This work is part of a continuing study of mechanisms which energize charged particles in the high latitude regions of the earth's magnetic field.

### **Division of Building Research**

Operation of a small field station was continued at Thompson, Manitoba to provide support for various engineering and terrain studies of permafrost being carried out in

northern Manitoba. Load-deformation and long-term testing of anchors in permafrost at Thompson was continued. Investigations of micro-climate and terrain factors affecting the distribution of permafrost in the discontinuous zone were continued at Thompson.

Observations were continued throughout the year and field surveys conducted during May, August and October at Inuvik to assess the foundation performance of various structures including buildings, oil tanks, powerhouse and wharf constructed on permafrost. Studies of terrain disturbance were also continued. Additional instrumentation was installed at the Inuvik airstrip, which was paved with asphalt in 1969, to determine changes in the ground thermal regime due to the newly imposed surface conditions.

Field observations of sand dykes on thawing permafrost at Kelsey in northern Manitoba were continued. Instrumentation was fabricated and installed for a similar study at the Kettle Generating Station on the Nelson River in co-operation with Manitoba Hydro.

A survey of the distribution and nature of permafrost in the vicinity of the boundary between the discontinuous and continuous permafrost zones was initiated, in co-operation with the University of Alberta, with the installation of ground temperature cables and other equipment near Yellowknife, Northwest Territories. Preliminary investigations of permafrost in mountainous regions were begun, in co-operation with the University of British Columbia, with the installation of thermistor cables on selected mountain summits near Vancouver.

In cooperation with the NRC National Aeronautical Establishment a 1,200-mile traverse was flown in the discontinuous permafrost zone of Manitoba to evaluate the use of infrared sensing techniques to map the distribution of permafrost.

Laboratory tests on the strength of St. Lawrence River ice were carried out for the Department of Transport in connection with icebreaker performance. Studies of factors influencing freeze-up and break-up of ice covers were completed.

### **Radio and Electrical Engineering Division**

During 1968, DA-3 auroral all-sky cameras were in operation at Poste-de-la-Baleine (Great Whale River), Quebec, Moosonee, Ontario, and Churchill, Manitoba. The Great Whale cameras were used on a conjugate-point program with identical cameras being exposed at Byrd Station in the Antarctic. Photo-electric auroral photometers, utilizing interference filters, were also used at Great Whale and Byrd. An automatic auroral photometer was tested for two months in the fall at Great Whale River.

Auroral observations in the infrared and visible regions of the spectrum were made during November and December 1969, aboard a Convair 990 jet aircraft operated by NASA and based at Churchill.

Infrared airglow photometers were flown on four rocket flights from Churchill. Auroral radar equipment was operated at Poste-de-la-Baleine, and at Churchill and Thompson, Manitoba. During 1969 plasma probes were placed on 12 rockets fired at Churchill and two fired at Resolute. Micrometeoroid detectors were placed on four rockets fired at Churchill.

### **Space Research Facilities Branch**

The Council, through its Space Research Facilities Branch continues to operate the Churchill Research Range in conjunction with the National Aeronautics and Space Administration of the United States. Programs include the launching of sounding rockets and balloons to investigate geophysical phenomena in the upper atmosphere on behalf of scientists from Canada, the United States, and other countries. Associated ground based experiments are also carried out by the Technical Support Section of the range.

Four Black Brant IIIB sounding rockets were launched from Resolute in October and November 1969 by the Space Research Facilities Branch with experiments for the University of Calgary, the Radio and Electrical Engineering Division and The Division of Physics of the National Research Council of Canada. Assistance was given to the National Aeronautics and Space Administration of the United States, who launched rockets from Cape Parry and Resolute during the year.

The Space Research Facilities Branch is also responsible for the coordination of various cooperative scientific programs at the Great Whale Geophysical Station. These facilities have been used occasionally in connection with balloon launches from the Churchill Research Range.

### **National Aeronautical Establishment**

In July and August 1969, a number of infrared surveys were conducted in the North in cooperation with other government departments using the NAE North Star aircraft outfitted with an HRB Reconofax IV Thermal Infrared Mapper.

From Thompson, Manitoba, aerial surveys were made of permafrost areas being studied on the ground by the Division of Building Research. Thermal infrared imagery and colour photography of the test areas were obtained.

Surveys were conducted:—

From Inuvik to:

- a) investigate an area burnt over in the fall of 1968 to determine the effect of removal of vegetation from the surface of the ground in permafrost areas;
- b) investigate pingos and ice polygons;
- c) investigate mixing and lack of mixing of the main tributaries flowing into the Mackenzie River; and
- d) investigate the shoal and mud flat areas of the Mackenzie River Delta.

From Fort Nelson:

A survey of the Mount Ediza area near Telegraph Creek to investigate the various rock and lava formations being studied by the G.S.C./E.M.R. Vancouver.

## **Plans for 1970**

### **Division of Physics**

Both the rocket program and the cosmic ray monitoring program will continue in 1970 but at slightly reduced levels.

### **Division of Building Research**

Surveys of permafrost occurrence will be conducted in the Yellowknife area and mountainous regions of B.C. Micro-climate and terrain studies of permafrost at Thompson will be expanded during the year. The performance of engineering structures and facilities founded on perennially frozen ground will be continued at Inuvik, Northwest Territories, Thompson, Kelsey and Gilliam, Manitoba. Operation of the Thompson Field Station as a support facility for field projects in northern Manitoba will be maintained.

### **Radio and Electrical Engineering Division**

Instrumental equipment for the observation of aurora and air glow will continue in use at Poste-de-la-Baleine, Churchill, Thompson and Moosonee both on a routine basis and on short-term expeditions for specific observations. Use of upper-air rockets will continue much as in 1969.

### **Space Research Facilities Branch**

Operation of the Churchill Research Range will be continued for the launching of sounding rockets and balloons to investigate geophysical phenomena in the earth's atmosphere and in space on behalf of scientists from Canada, the United States and other countries.

Because of financial restrictions the National Research Council will be phasing down operations at Churchill Research Range and by the end of 1970 will be operating a considerably smaller range facility.

No sounding rockets will be launched from Resolute during 1970 due to a commitment by the National Research Council of Canada to launch vehicles into the 1970 eclipse in Nova Scotia.

The Great Whale Geophysical Station will continue its work of auroral photography and photometry, and making a variety of radio frequency measurements for Canadian and U.S. agencies. Most of these measurements are correlated with measurements made at Byrd Station in Antarctica, which is at the geomagnetic conjugate point of Great Whale. Facilities at Great Whale will be used as required to supplement those at Churchill Research Range in connection with rocket and balloon born experiments.

### **Division of Mechanical Engineering**

The VTOL commercial air transport research program will be continued. This program is centred in three of the Division's laboratories in Ottawa with close liaison being maintained with commercial air carriers, including those operating in Canada's North. Close liaison will also be maintained with potential Canadian manufacturers.

The ACV heavy transporter program will be continued with the view to providing technical back-up support to Canadian companies who are involved with the transportation of heavy cargoes. Close liaison will also be maintained with potential manufacturers.

# **NORTHERN CANADA POWER COMMISSION**

## **NORTHERN CANADA POWER COMMISSION**

### **Responsibilities**

To provide public utilities in the Yukon and Northwest Territories as authorized by the Governor-in-Council. To operate each plant from consumer revenue on a self-sustaining basis including repayment of capital expenditures.

### **Long-Term Plans**

Forecast and normal planning in order to establish, maintain and expand electrical and utility requirements.

### **Review of 1969 Operations**

#### **Snare/Yellowknife, Northwest Territories**

- a) A 5,150 kw diesel electric generating unit is being installed in a new building to supplement the standby and peaking capacity for the Yellowknife area. Completion of this project will be in the early 1970's.
- b) A 3,000 bbl fuel storage tank was erected adjacent to the new building.

#### **Fort Smith/Taltson**

- a) A 1,500 kw gas turbine unit was moved from Frobisher Bay, Northwest Territories to Fort Smith and installed there to supplement the stand-by capacity in Fort Smith, Northwest Territories. Completion of this project will be in the early 1970's.

#### **Mayo, Yukon Territory**

- a) A new 3,800 hp turbine was installed to replace the original No.2, 3,000 hp turbine, which was damaged earlier in the year.

#### **Fort Simpson, Northwest Territories**

- a) A 280 kw diesel electric generating unit was moved from Fort Smith to Fort Simpson. This unit is now being installed and will be operational in 1970.

#### **Whitehorse, Yukon Territory**

- a) A third hydraulic turbine unit of 11,000 hp generating 8,000 kw was commissioned during this year increasing the hydro plants installed capacity to 19,000 kw. This, together with the two diesel generating units installed in 1968, make a total installed capacity of 28,000 kw.
- b) A 250-mile, 138 kv transmission line from Whitehorse to Anvil Mining Corporation's mine-mill complex in the Vangorda Creek area, was also completed and commissioned this year.

**Inuvik, Northwest Territories**

- a) A 600 kw diesel generating unit was moved from Fort Smith to Inuvik, Northwest Territories. This unit is now installed and is expected to be commissioned early in 1970.
- b) Foundation for a one million gallon fuel storage tank was completed.
- c) A new pumping station was installed to increase the capacity of the sewage outfall line.

**Frobisher Bay, Northwest Territories**

- a) A 2,585 kw diesel electric generating unit was installed in the main power plant.
- b) Electrical, heat, water and sewage services were extended to the new building complex.

**Fort McPherson, Northwest Territories**

- a) A 3,000 bbl fuel storage tank was erected to increase storage capacity.

**Cambridge Bay, Northwest Territories**

- a) A 5,000 bbl fuel storage tank was erected to hold Heavy X Fuel, shipped by barge from Norman Wells, for diesel generation.

**Baker Lake, Northwest Territories**

- a) A 700 kw diesel electric generating unit was installed increasing the installed capacity to 1,300 kw.
- b) Three 15,000-gallon fuel storage tanks were erected to increase storage capacity.

**Fort Good Hope, Northwest Territories**

- a) The Commission assumed responsibility for the supply and distribution of power at Fort Good Hope, November 1969.
- b) A new powerhouse building was erected and three diesel generating units installed with a total installed capacity of 375 kw.
- c) Two, 2000-gallon fuel storage tanks were moved from Fort Smith and erected at Fort Good Hope.

# Review of 1969 Operations

## Northwest Territories

PLANT	UTILITIES	CAPACITY	KWH OUTPUT	STAFF	CONSUMERS
Taltson (Hydro)	Power	25,000 hp	110,738,770		2 (wholesale)
Fort Smith Distribution System (Diesel)		2,250 kw		10	647
Pine Point Distribution System					247
Inuvik (Diesel)	Power Heat Water and Sewerage Mtee. Services	4,500	14,240,400	36	870 328 371
Fort McPherson (Diesel) (Operated for IAND)	Power, Heat Water, Sewerage Mtee. Services	750 kw	1,513,630	11	88
Fort Simpson (Diesel)	Power, Heat Water, Sewerage Mtee. Services	1,225	2,687,874	20	255
Aklavik (Diesel) (Operated for IAND)	Power	760	931,697	5	61
Frobisher Bay (Diesel & Gas Turbine)	Power, Heat Water, Sewerage	4,000 kw	10,769,665	35	579
Fort Resolution (Diesel)	Power	450 kw	800,739	3	138
Chesterfield Inlet (Diesel)	Power	400 kw	400,700	2	58
Snare River (Hydro) (Snare Rapids) (Snare Falls) Standby Diesel	Power	17,550 hp	87,868,816	13	4 (wholesale) 3
Rae Distribution System	Power	1,000 kw			156

Cambridge Bay (Diesel)	Power	1,200 kw	1,798,730	5	47
Coppermine (Diesel)	Power	600 kw	780,490	5	110
Baker Lake (Diesel)	Power	680 kw	1,289,090	4	71
<b>Yukon Territory</b>					
Mayo (Hydro)	Power	6,000 hp	24,382,929	7	2 (wholesale) 182
Whitehorse (Hydro) Diesel	Power	15,000 hp 9,000 kw	90,816,470	19	6 (wholesale)
Faro Distribution System				1	132
Dawson (Diesel)	Power Water and Sewerage	750 kw	2,144,040	10	411 314
Norman Wells (Gas Turbine)	Power	700 kw	1,787,584	2	47 1 (wholesale)

Consolidated approximate Gross Operating Revenue (All Plants) \$8,168,000

## **Plans for 1970**

### **Northwest Territories**

#### **Frobisher Bay**

Installation of additional 4,000 kw of diesel generating capacity.

Extension of services to new school and children's receiving home.

#### **Inuvik**

Construction of a new powerhouse building.

Installation of 5,150 kw diesel electric generating unit.

Erect a one million gallon fuel storage tank.

#### **Fort Smith/Taltson**

Construction of a new standby powerhouse building at Pine Point.

Installation of a 5,180 kw diesel electric generating unit at Pine Point.

#### **Yellowknife/Snare**

Installation of remote control (stop-start) system for the operation of the diesel plant from the Yellowknife Control Centre.

Extension of the 34.5 kv transmission line from the diesel standby plant to the 115 kv terminal.

Construction of three new employee's housing units.

#### **Fort Resolution**

Construction of a 34.5 kv transmission line from Pine Point to Fort Resolution.

Partial automation of diesel plant.

#### **Chesterfield Inlet**

Install two 15,000 gallon fuel storage tanks to increase storage capacity.

#### **Fort Good Hope**

Construct one employee housing unit.

#### **Norman Wells**

Installation of a 500 kw diesel electric generating unit.

## **Yukon Territory**

### **Whitehorse**

Installation of additional 5,150 kw of diesel generating capacity.

Installation of remote control (start-stop) system for the operation of the diesel units from the hydro plant control room.

Installation of a 5,150 kw diesel electric generating unit at Faro.



# **NORTHERN TRANSPORTATION COMPANY LIMITED**

## **NORTHERN TRANSPORTATION COMPANY LIMITED**

### **Responsibilities**

To act as a common carrier of freight within the Mackenzie River watershed under the jurisdiction of the Canadian Transport Commission.

To distribute freight by sea from Tuktoyaktuk to the DEWline stations and other populated areas in the Western Arctic.

### **Long-Term Plans**

Normal planning to meet responsibilities plus forward planning to have sufficient equipment available to meet anticipated expansion of the oil exploration programs and other requirements.

### **Review of 1969 Operations**

Tonnage handled by the Company within the Mackenzie River watershed and the Western Arctic for 1969 amounted to 256,000 tons which makes an increase of 23.8 per cent over the 1968 total of 206,970 tons. Traffic into the Lake Athabasca area showed a slight decrease due to the reduced interest in uranium at this time.

Tonnage increased along the Mackenzie River and into the Western Arctic as well as to the North Slope of Alaska. Tonnage to the Prudhoe Bay area increased from 6,000 tons in 1968 to 26,000 tons in 1969. The Mackenzie River tonnage increases were due, mainly, to the oil exploration and drilling activity along the Mackenzie.

Ice was encountered continually on the route from the Mackenzie River to Prudhoe Bay, particularly in the area from Herschel Island to Barter Island. Ice conditions east of the Mackenzie Delta were good.

Low water conditions were again encountered the latter part of August and continued through the balance of the season; the Sans Sault area being the most critical with it being necessary to lighten barges through this area causing delays and additional handling costs. Considerable damage to marine equipment was caused at the Sans Sault and just below Simpson. However, all commitments were completed.

### **Plans for 1970**

Capital expenditures in the amount of approximately eleven million dollars are anticipated. This will add eight more barges of approximately 1,500 tons carrying capacity to the fleet, as well as one additional tug for the Mackenzie River. Additional expenditures will be made to expand the handling facilities at Hay River and Inuvik, while replacement of equipment will be carried out at other agencies.

# POST OFFICE DEPARTMENT

## POST OFFICE DEPARTMENT

### Responsibilities

Provision of mail service to and from post offices in the Yukon and Northwest Territories.

### Long-Term Plans

To provide adequate mail service, subject to the availability of transportation services, at an equitable cost.

### Review of 1969 Operations

#### Transportation

The following table lists the scheduled air and surface mail transportation services on which mail was conveyed to and from the Yukon and Northwest Territories showing the expenditures for the fiscal year 1968-69:

#### Yukon Territory

Air Transportation	(dollars)
Dawson — Old Crow	35,034.30
Whitehorse — Ross River	4,320.40
Vancouver — Whitehorse	915,371.57
Whitehorse — Dawson	36,714.28
	991,440.55
Surface Transportation	(dollars)
Atlin and Whitehorse	6,000.00
Dawson and Clinton Creek	4,732.00
Dawson Creek and Whitehorse	82,105.92
Mayo and Elsa	3,361.96
Whitehorse and Alaska Highway (M1202)	10,420.00
Whitehorse and Dawson	15,163.00
Post Office to Airport Services	10,186.62
Total	131,969.50
Whitehorse Rural Route No. 1	5,000.00
Total expenditure for mail service to and from the Yukon Territory:	1,128,410.05.

#### Northwest Territories

Air Transportation	(dollars)
Edmonton — Mackenzie River Area	647,719.29
Yellowknife — Discovery	1,277.10
MacKenzie Delta — Coppermine	44,093.46

Yellowknife – Port Radium (Established March 1969)	79.04
Yellowknife – Snowdrift	685.91
Fort Nelson – Fort Liard	1,487.20
Inuvik – Sachs Harbour	3,030.00
Resolute – Area	36,375.49
Montreal – Resolute	404,113.85
Christmas Air Drop (Armed Forces)	2,489.95
Fort Churchill-Baker Lake – Coral Harbour	109,094.19
	1,250,445.48

<b>Surface Transportation</b>	(dollars)
Hay River and Hay River Annex	1,560.00
Hay River and Rae	4,500.00
Peace River and Hay River	59,078.12
Post Office to Airport Services	24,882.00
<b>Total</b>	<b>90,020.12</b>

Total expenditure for conveyance of mail to and from the Northwest Territories:  
\$1,340,465.60.

<b>Expenditures for Salaries</b>	(dollars)
Northwest Territories	189,526.05
Yukon Territories	228,321.26

<b>Revenue</b>	(dollars)
Northwest Territories	215,314.85
Yukon	219,559.12

#### **New Post Offices**

	Opening Date
Port Radium, N.W.T.	14 March, 1969
Repulse Bay, N.W.T.	1 August, 1969
Faro, Yukon	1 October, 1969

The post offices at Discovery, Northwest Territories, and McCabe Creek, Yukon, were closed on the June 10, 1969 and August 30, 1969 respectively.

#### **Employment Statistics**

414 persons were employed full-time, of which 85.2 per cent were recruited locally.  
49 persons were employed part-time, of which 91.7 per cent were recruited locally.  
36.08 casual and seasonal man years were utilized. All casual and seasonal employees were recruited locally.

#### **Plans for 1970**

To provide adequate postal service, commensurate with cost.



# **ROYAL CANADIAN MOUNTED POLICE**

## **ROYAL CANADIAN MOUNTED POLICE**

### **Responsibilities**

The basic responsibility of the Royal Canadian Mounted Police in the Yukon Territory and the Northwest Territories is the preservation of peace and the maintenance of law and order. The Force is the only law enforcement agency in the North and is responsible for the enforcement of all Federal Statutes, Territorial laws, and through agreement with four municipalities, enforces municipal by-laws in the communities of Dawson, Whitehorse, Yellowknife and Hay River.

### **Long-Term Plans**

Oil and mineral exploration in the Yukon and Northwest Territories continues at a rapid pace and has been directly responsible for the establishment of new communities in previously inaccessible and inactive areas. This economic development has resulted in a substantial population increase, both permanent and transient, and has necessitated a corresponding increase in our establishment. Our long-term plans include new detachments in new areas of economic development and the adjustment of priorities with respect to personnel, as and when the need arises.

### **Review of 1969 Operations**

During 1969 a complete re-organization of "G" Division was undertaken. This included the disposal of all sleigh dogs in favour of motorized toboggans, the closure of Elsa and Arctic Red River Detachments and the deployment of personnel within the Division to the best possible advantage.

The migration of Indians and Eskimos from their traditional hunting camps to the main centres of activity and development precludes the need for lengthy dog-team patrols and it was therefore decided to dispose of our sleigh dogs in favour of motorized toboggans which provide our members with greater mobility at approximately half the cost of maintaining dogs.

The settlements of Elsa in the Yukon Territory and Arctic Red River in the Northwest Territories experienced a decline in population. This resulted in a corresponding decline in police work. An extensive survey indicated that we could no longer justify maintaining detachments at these locations and they were therefore closed and the personnel deployed.

The R.C.M. Police now maintain 40 detachments in northern Canada, 31 in the Northwest Territories and nine in the Yukon Territory. Members stationed at these detachments patrol in excess of two million miles annually; by motor vehicle, motor toboggan, aircraft and on foot.

### **Plans for 1970**

The major change planned for 1970 is the transfer of our Sub-Division Headquarters at Fort Smith to Yellowknife during the month of June. A new combined Sub-Division/Detachment building is presently under construction at Yellowknife, and is due for completion in April this year. In addition to housing the Sub-Division and Detachment personnel, this building will also accommodate our Identification and Telecommunications Sections.

# **UNEMPLOYMENT INSURANCE COMMISSION**

## **UNEMPLOYMENT INSURANCE COMMISSION**

### **Responsibilities**

Administration of the Unemployment Insurance Act to ensure the workers in this area protection against unemployment through the following Commission's local offices: Prince George, B.C., which serves the Yukon Territory; Edmonton, Alberta, which serves the District of MacKenzie, Northwest Territories; Winnipeg, Manitoba, for the District of Keewatin; and Montreal, Quebec, for the Baffin Island.

### **Long-Term Plans**

To provide and maintain the best service possible taking whatever necessary action is required in accordance with the results of periodical studies on the service being provided and changes in the situation.

### **Review of 1969 Operations**

Following the introduction of the generalized mail system concept a few years ago, the Canadian population has been dealing with the Commission, by mail, for all unemployment insurance matters. Therefore, the Commission operates area offices only in large centers, but has employees who travel throughout the areas to conduct audits and interviews with a view to ascertain the adherence to the specifications of the Act. The Unemployment Insurance services were provided to the population in the Yukon and the Northwest Territories during 1969 through the above-mentioned offices. In addition, agents are appointed to help the people complete their application forms for benefits. The Commission has agents located at Whitehorse, Yukon Territory, Yellowknife, Northwest Territories and Hay River, Northwest Territories.

### **Plans for 1970**

To continue the normal operations of the unemployment insurance service and make improvements whenever necessary.

### **Employees**

The Commission did not have any employee in the Yukon and the Northwest Territories during 1969. The agents, who are local residents, are not employees of the Government or the Commission, but are working under a contract for services. They are paid on the basis of a fixed amount for each form they complete.

# APPENDICES

# APPENDIX "A"

## Revenues and Expenditures in the Northwest Territories and the Yukon Territory Fiscal Year 1968-69

Department	Northwest Territories		Yukon Territory	
	Revenues	Expenditures (dollars)	Revenues	Expenditures (dollars)
Agriculture . . . . .	27,170.41	64,629.26	11,334.12	89,292.20
Canada Emergency Measures Organization . . . . .	—	14,032.00	—	—
Canada Pension Plan . . . . .	—	9,215.00	—	13,575.52
Canadian Broadcasting Corporation . . . . .	—	610,000.00	—	323,000.00
Chief Electoral Officer . . . . .	400.00	47,848.79	200.00	15,052.93
Communications . . . . .	—	—	—	22,357.68
Consumer and Corporate Affairs . . . . .	4,599.55	1,618.80	4,772.11	1,386.85
Customs and Excise . . . . .	599,294.43	70,182.99	3,872.12	1,655.50
Energy, Mines and Resources . . . . .	4,112.00	225,048.00	6,085.00	42,400.00
Finance . . . . .	—	4,816,951.06	—	465,625.98
Fisheries and Forestry . . . . .	10,685.00	195,509.00	—	27,369.00
Indian Affairs and Northern Development . . . . .	10,931,922.67	35,072,654.83	1,475,262.43	4,796,174.85
Justice . . . . .	21,574.59	252,753.86	47,589.38	175,688.45
Manpower and Immigration . . . . .	—	304,042.86	—	110,053.04
National Defence . . . . .	—	1,407,583.00	—	107,750.00
National Health and Welfare . . . . .	—	8,421,264.23	—	2,950,511.13
National Revenue . . . . .	1,204,455.77	—	783,307.11	244,049.59
Northern Canada Power Commission . . . . .	5,668,632.00	4,811,811.00	603,166.55	7,872,330.00
Post Office . . . . .	198,412.71	1,541,386.60	1,402,077.00	1,330,101.38
Public Works . . . . .	182,785.00	1,353,739.00	217,600.61	5,406,913.00
Royal Canadian Mounted Police . . . . .	784,864.93	2,291,721.72	690,131.00	1,019,083.23
Transport . . . . .	832,143.83	9,330,666.95	65,803.57	1,699,905.34
Supply and Services . . . . .	—	33,908.10	169,030.99	—
Veterans Affairs . . . . .	—	125.70	—	397.49
N.W.T. Government . . . . .	—	—	—	—
Yukon Government . . . . .	—	—	4,200,000.00	18,000,000.00

## **APPENDIX "B"**

### **LEGEND**

#### **GOVERNMENT AND AGENCY EMPLOYMENT IN THE NORTH, 1969**

##### **Year Round Establishment**

Personnel who are employed and work in the north throughout the year.

##### **Seasonal Establishment**

Personnel who are hired for seasonal projects in the north.

##### **Casual and Term Employment**

Casual. Personnel who are hired for less than six months. Or on a term basis for more than six months.

Skilled. Includes Building Trades, Equipment Operators, Weather Station Observers, Office Workers, Administrators, Medical Officers, Teachers, etc.

Unskilled. Includes Labourers, Stevedores, etc. Where training and experience are not significant requirements.

## APPENDIX B

## GOVERNMENT AND AGENCY EMPLOYMENT IN THE NORTH 1969 - BY EMPLOYEE MAN YEAR

DEPARTMENT OR AGENCY	YEAR ROUND ESTABLISHMENT				SEASONAL ESTABLISHMENT				CASUAL EMPLOYMENT			
	SKILLED		UNSKILLED		SKILLED		UNSKILLED		SKILLED		UNSKILLED	
	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally
AGRICULTURE	3	2		2		4						
CANADIAN BROADCASTING CORPORATION	13	17				3			2	46		4
COMMUNICATIONS	9											
ELDORADO NUCLEAR LTD.	446	74	152	25								
ENERGY' MINES & RESOURCES												
Geological Survey of Canada	8								15			
Observatories Branch					5				1			
Marine Sciences Branch												
Inland Waters Branch												
Surveys & Mapping Branch	22	4		2					5	1	1	2
Polar Continental Shelf					7.6				13.7	0.1	1.0	3.9
									3.5	4.5	1.	4.
FISHERIES & FORESTRY		1					1	7		1		
INDIAN AFFAIRS & NORTHERN DEVELOPMENT												
Canadian Wildlife Service	9				10							9

## GOVERNMENT AND AGENCY EMPLOYMENT IN THE NORTH 1969 - BY EMPLOYEE MAN YEAR

DEPARTMENT OR AGENCY	YEAR ROUND ESTABLISHMENT				SEASONAL ESTABLISHMENT				CASUAL EMPLOYMENT			
	SKILLED		UNSKILLED		SKILLED		UNSKILLED		SKILLED		UNSKILLED	
	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally
Indian-Eskimo Economic Development	56	19		17	2	7		11		5		4
National & Historic Parks Branch	11	6		5			1	4.5 6		8.75 13		12.99
Northern Economic Development Branch	26	24		1		15						
Territorial Relations Branch	346	60		100	39			86	1	22		131
Community Affairs Branch	10											
JUSTICE												
NATIONAL DEFENCE												
Canadian Armed Forces	439	1		6	5							6
Defence Research Board												
NATIONAL MUSEUM OF CANADA												
Museum of Man	3									2		
Natural Science												
NATIONAL RESEARCH COUNCIL	117	45		41					1.8		2	0.1

## GOVERNMENT AND AGENCY EMPLOYMENT IN THE NORTH 1969 - BY EMPLOYEE MAN YEAR

DEPARTMENT OR AGENCY	YEAR ROUND ESTABLISHMENT				SEASONAL ESTABLISHMENT				CASUAL EMPLOYMENT			
	SKILLED		UNSKILLED		SKILLED		UNSKILLED		SKILLED		UNSKILLED	
	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally	Hired in south for Northern Service	Hired Locally
NATIONAL REVENUE Customs & Excise Taxation	3	12								3		
NORTHERN CANADA POWER COMMISSION	98	75	15						2		7	43
NORTHERN TRANSPORTA- TION COMPANY LIMITED	4	8			139	7	191	58		13		64
POST OFFICE	65	398								36		
PUBLIC WORKS Pacific Region	6,28	17,96						.37	8.45	73.78		20.31
Fort Churchill	5	11	3					1		4		13
Northwest Territories	2	3			.5			2.75	22.5	1.75	14	9
Quebec Region					1							
R.C.M. POLICE	165	29										37
TRANSPORT Air Services Marine Service	283	11			11.5		8	1	10.34	14.71	17.4	8.14
					7				25.08			
GOVERNMENT OF N.W.T.					NO REPORT							
GOVERNMENT OF YUKON	23	601	1	135		91		83		247		278



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